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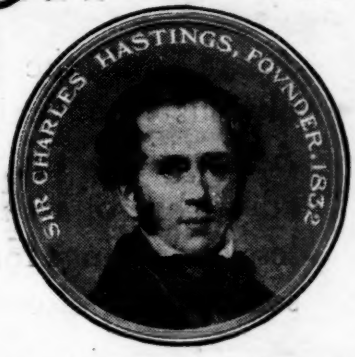

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WOMEN OF THE ÆGEAN IN MINOAN TIMES (1).—The frescoes show us the women of ancient Crete mixing freely with men and apparently occupying a position comparable with that of modern times. They seem to have played a greater part there than anywhere else—even than in Egypt. It is thought that "Mother-right" existed among the Ægeans—a custom which included the reckoning of descent in the female line and rights of inheritance by the daughter. The matrilinear social structure always implies a general high position of woman both socially and economically. In bearing, in coiffure, in dress, the ancient Cretan women are extraordinarily modern; one would say the fashions were those of yesterday. The illustration on the left is that of a terra-cotta figurine found in a primitive sanctuary. Her loose, open bodice is fashioned with a collar of "Medici" type, her dark bell-shaped skirt is ornamented with yellow stripes. Her costume is characteristic and typical of Crete. It is uncertain whether she wears a hat or whether the creation is hair-dressing. Her companion wears a bodice of "volers" style and has her hair dressed in the characteristic Minoan fashion.

DATE: Down to c. 1600 B.C.

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British Medical Association.

PROCEEDINGS OF SECTIONS AT THE ANNUAL MEETING, 1923.

SECTION OF MEDICINE.

Sir THOMAS J. HORDER, Bt., M.D., F.R.C.P., President.

DISCUSSION ON DIABETES AND INSULIN.

PRESIDENT'S INTRODUCTORY REMARKS.

WHEN the Committee of this Section met to arrange the discussions which form its chief business, one subject occurred to all of us as being apposite. The fact which led us to choose diabetes for our first discussion was, of course, the introduction of insulin as a remedy for the disease. If we do not discuss insulin at this meeting of the Association our patients will be much surprised, and with good reason. If we do not discuss it they will probably assume, and again with reason, that we are quite satisfied that in insulin we possess a "cure" for diabetes, and that nothing more needs to be said on the matter. I am afraid a good many persons have already assumed this, and perhaps such an assumption is not surprising in view of certain generalizations that have got abroad and which, if they do not carry the hall-mark of authority, at least have not been authoritatively contradicted.

It is notoriously difficult to control popular ideas about new remedies. The wish is so much father to the thought. The very fact that such epoch-marking events as the discovery of insulin are rare takes popular credence, when they do come, farther than facts justify, and farther than the discoverer claims. And when the disease is a common one, as diabetes is; when it often baffles our best efforts, and terminates in dramatically lethal fashion, as diabetes does; then the public is on the tiptoe of expectation so soon as even a preliminary announcement is made of a remedy which promises specific results. The problem is regarded as being already solved, whereas it may well be that the successful preparation of this internal secretion of the pancreas will prove to be as great an asset to medical science by assisting the interpretation of phenomena hitherto obscure, as in the provision of a therapeutic agent in diabetes.

Only a superficial hearer will read into these remarks a detraction from the great value of Dr. Banting's discovery; in reality such remarks enhance its value. Has not the essence of the problem of diabetes hitherto been the almost certain fact that under that name we have been dealing not with one biochemical disturbance only, but with several? It seems probable that the use of insulin, controlled by careful observations, will not only still further establish this fact but will also help to mark off, much more clearly than before, certain very different types of cases of diabetes met with in practice. One result of this segregation we are already observing: certain cases of diabetes are benefited much less by insulin than are others, and this is so even when we make due allowance for all those collateral points in the dietetic part of the treatment, attention to which we know to be so important. Certain cases will, doubtless, be found not to be benefited at all. And if we do not make this position quite clear we shall see many patients suffer the bitter Nemesis of disappointment after entertaining a false hope for which we may, quite unwittingly, have been partly responsible.

Some very fundamental questions will be discussed to-day, and we shall hear the opinions of men who are well qualified to speak upon them. (1) If, as someone has aptly put it, insulin acts as a walking-stick to a lame pancreas, will some of the cases of diabetes that show such striking improvement under treatment by this remedy recover their lost power of maintaining a normal "blood sugar," so as to carry on without its help? (2) This question is bound up with another, of considerable significance: is diabetes necessarily a progressive disease? If it is, it follows that the outlook, even with the specific help of insulin, is still not good for the young diabetic. But if it is not, then the future need not be so gloomy, now that we are armed with this new therapeutic measure. (3) At what level should the "blood sugar" be maintained in order that the use of insulin shall be most effective? Should it be at the normal level, or should it be a little below the normal level, or should it be as low as possible, consistent with producing no untoward symptoms?—aiming, in this latter case, at resting the pancreas very thoroughly, and thus hoping for restoration of function. (4) Allowing that blood-sugar estimations have been imperative and essential to the proper study of insulin in treatment and to the control of dosage, will such estimations continue to be necessary in every case? (5) And, if so, can the general practitioner consider that either of the methods at present in use is practicable, and at the same time accurate? (6) If he may not, will it be a safe criterion by which to control the efforts he is making to increase the patient's diet to adopt the older method of estimating the urinary sugar? (7) And, if not, at how long intervals is it safe to seek the more scientific control of a blood-sugar estimation? (8) Can any general guide be given as to the best proportions of the main food principles which it is wise to employ in venturing upon an increase of diet when, by the use of insulin and by starvation, the blood sugar has kept within a normal range for several days? Should it be, for example, protein 4, fat 2, and carbohydrate 1, or some other ratio? Or, in this matter, must each case be regarded as a law unto itself? (9) Another question may arise: is there not a hope that the active principle of insulin may be isolated in such fashion as to enable us to administer the internal secretion of the pancreas by mouth, protecting it from the gastric juice by some suitable shield? Such a method of treatment would, of course, be a great boon, for not only would it obviate the necessity of such frequent hypodermic injections, it is highly probable that the ill effects of overdoses of the remedy, which are nowadays by no means seldom seen, would be much reduced both in frequency and in intensity. There is, I understand, such a preparation actually on trial. It will be interesting to hear of any results that have followed its use. (10) We shall, doubtless, hear about the abuses of insulin: how that the greedy glycosuric, despite expert advice, wheedles a less informed practitioner into administering it, with the hope that he (the patient) may thereby escape from the tedium of even a reasonable dietetic restriction, and how he may pay the penalty of his gluttony. We may also hear of undesirable symptoms produced by the use of insulin in cases of renal glycosuria. (I am glad that, at last, we are getting rid of that contradictory term "diabetes innocens.") It would probably be quite a vain request if I asked that in this discussion some consideration should be given to other aspects of diabetes than those concerned with insulin. (11) I refer to such matters as the relation of sepsis to diabetes, the question of the ultimate causation of the pancreatic cases—whether, for example, any here present have observations to offer (12) concerning the hypothesis that the disease is of infective origin—and the factor of (13) heredity, which is so mysterious. I do not propose to make any such request. Insulin is probably the greatest contribution yet made to the study of diabetes, whether we regard it as a remedy or as an incentive to further inquiry. If I were asked to name the two contributions next in significance I should instance the modern conception of diabetes in relation to treatment, and the establishment of the prime importance of "blood-sugar" estimations as the cardinal guide to our control of the disease, with the new and simplified methods of carrying out such estimations. I should like, in passing, to honour the men whose labours and whose genius have, by laying such a sure foundation in respect of these two things, helped so much to make Dr. Banting's discovery possible. These same principles are to-day enabling us to extract the greatest possible efficiency out of insulin. In face of these facts I cannot well ask for a discussion of other matters. Let us talk insulin.

May I, on your behalf, accord a very hearty welcome to Dr. Banting, who has so kindly consented to join in our discussion? As our very distinguished visitor, I will ask him to speak first. If he has anything new to tell us, we shall be very interested to hear it. If he has nothing new, then we shall like to hear the old story again from his own lips. I hope that Dr. Banting will avail himself of some of the time usually allowed to the opener of a discussion, and which, upon this occasion, I have not felt it necessary to utilize.

OPENING ADDRESS

BY

F. G. BANTING, M.D.,
Toronto.

DR. BANTING said that Mr. Best and his associates thanked the medical profession for the way in which it had received the result of their experiments. He outlined the story of the research which led to the preparation of insulin in sufficient quantity. Many attempts were made to prepare extracts of the pancreas to furnish the active principle. Following ligation of the pancreatic ducts, dogs did not become diabetic and the acinous cells of the gland alone degenerated. They had ligatured the ducts and ten weeks later the degenerated pancreas was removed and extracted with saline. In a depancreatized dog the blood sugar rose perhaps 20.40 per cent. in a few days, the wound broke down, a scum formed at the inner canthus of the eye, the animal weakened, developed great hunger and thirst, underwent a rapid loss of flesh and was therefore most suitable for experimental purposes. The injection of the above extract into such a dog caused a fall in the blood sugar, a gain in strength, and the animal lost its ravenous appetite. But this was not a suitable method of preparing insulin. The long continued injection of secretin with a view to exhausting the acinous cells and thereby destroying trypsin was found to be uncertain. An extract was then prepared of the pancreas of foetal calves; up to the fourth month the acinous cells contained no trypsin granules. This extract was found to be very potent in lowering the blood sugar, and the second dog was killed by an overdose, and died with symptoms which are now known to be those of hypoglycaemia. The problem, then, was to extract the internal secretion from the whole pancreas by some chemical means which would destroy the proteolytic ferment and leave the insulin unharmed. Alcohol in certain percentages was tried. Dr. Cobb succeeded in fractionating out the active principle with 82 per cent. alcohol. Since then rapid progress had been made, and the product now contained no protein, was non-irritating, and more easily standardized.

Insulin in proper dosage in the laboratory reduced the blood sugar to normal or less; it rendered the urine sugar-free and by its means a depancreatized dog could be kept alive at least three times as long as without it. Without insulin such a dog would live from eight to twenty days. Dr. Banting with insulin had kept a dog alive for seventy days; the animal was then killed and no islet tissue was found. The liver of a depancreatized dog did not contain more than 0.5 per cent. of glycogen, but after insulin and glucose as much as 18 per cent. of glycogen might be present; insulin therefore enabled the dog to store glycogen in the liver. Fat replaced glycogen in the liver of depancreatized dogs. Four days after the operation the liver might contain 11 to 12 per cent. of fat and no glycogen, whereas four days' treatment with insulin might lead to the disappearance of fat and the appearance of 12 to 15 per cent. of glycogen. Adequate doses of insulin would control all forms of hyperglycaemia. The effects of overdose as seen in a rabbit accompanying the fall in blood sugar were hunger, the animal chewing the woodwork of its cage; it then became dull, had periods of intermittent convulsions and unconsciousness followed by coma. If given glucose the symptoms were relieved or prevented.

The clinical work had been done by Professor Duncan Graham and Drs. Campbell, Gilchrist, and Fletcher. There was no fixed method at present of managing diabetic patients. We were still in the course of experimental work. In Toronto if the case was at all severe it was admitted to hospital for three weeks for training in routine and the working out of tolerance. During this time a careful history was taken, special stress being laid on the question of heredity or the possibility of infection. The patient was kept for twenty-four hours on his usual diet to judge of the severity of the case. He was then put upon the "basal requirement diet": 3/4 gram of protein per kilo body weight was given per diem; a larger allowance of protein was made if the patient was not fully grown. The remaining calories were made up of carbohydrate and fat in the proportion of 1:1.3 (modified Woodyatt diet). The patient was kept on this for three or four days. If a mild case he became sugar-free; if severe, the sugar output became more constant. If sugar-free the carbohydrate was raised. If the patient could take 500 calories over and above the basal requirement insulin was not given.

The output of sugar was of value in estimating the initial dose of insulin. One unit of insulin might be regarded as metabolizing 2 to 2½ grams of carbohydrate in a severe case, but the exact quantity varied in different cases and in the same case at different times. Where infection was present the amount was also less. In mild cases one unit of insulin might metabolize 5 or 6 grams. The initial dose of insulin should not be sufficient to render the patient sugar-free; there was not sufficient glycogen in the liver to act as a buffer. As a rule 5 units might be given to begin with, unless the patient was comatose. The dose should be given one hour before meals, and never more than once a day. It was given before meals because in a normal individual the presence of carbohydrate in the blood stream stimulated the islet cells of the pancreas. It was advisable to keep the patient sugar-free by dieting and insulin; when sugar-free the pancreas tended to produce insulin. One patient, who was taking a diet of 620 calories, including 20 grams of sugar, passed 15 grams of sugar; but after treatment with insulin he was sugar-free on a diet of 980 calories containing 40 grams of sugar. There was evidence in many cases of an increasing tolerance as the result of insulin treatment, but this was not so marked in those cases who had been adequately controlled by diet. The frequency of blood-sugar estimation necessary to control treatment was still uncertain.

DISCUSSION.

Dr. P. J. CAMMIDGE (London) said that for many years the name diabetes mellitus had been generally applied to any condition in which sugar was passed in the urine, but as glycosuria might arise from a variety of causes its significance in that sense was merely symptomatic, like albuminuria or fever. Recently an attempt had been made, particularly by Allen, to restrict the term to glycosuria dependent upon disease of the pancreas, but in the absence of some reliable diagnostic sign by which pancreatic might be distinguished from non-pancreatic cases during life such a classification was merely juggling with words. Fortunately, however, the means were now available, and by appropriate analyses of the blood, urine, faeces, etc., it was possible to determine with considerable certainty whether a deficiency of the internal or external secretion of the pancreas existed in any particular case, and also to recognize or exclude most of the other causes known to give rise to hyperglycaemia.

Time would not permit him to deal with all the various analytical methods by which one form of glycosuria might be differentiated from another, full details of which were given in his book, entitled *New Views on Diabetes Mellitus*, which would shortly be published by the Oxford University Press; he therefore confined his attention to one, the relation of the "hydrolysis and difference values" of the blood to its sugar content before and after a standard breakfast. In this test a specimen of the patient's blood was taken from a finger prick, fasting, and part was used to determine the percentage of sugar by the Folin and Wu process in the ordinary way; the other part, after being freed from protein, was boiled with dilute hydrochloric acid, neutralized, and its reducing power determined by the same process. The figure indicating the latter he termed the "hydrolysis value," while the difference between this and the original sugar was called the "difference value." After the patient had taken the test breakfast, examination of the blood was

repeated at fifteen-minute intervals for the first hour and subsequently at the end of each hour, for four or five hours, and the results were plotted out in a graph. In a healthy individual and in certain forms of glycosuria, the percentage of sugar and the hydrolysis value of the blood were practically the same, the difference value never exceeding 0.01 per cent.; but in ordinary cases of diabetes the difference value curve was much higher, either fasting or at some period after the meal. By comparing the curves from a large number of cases with those exhibited by animals in which hyperglycaemia had been experimentally induced by various procedures, it had been possible to divide them into three main groups: (1) reversed curves, in which the difference value was abnormally high fasting but fell as the percentage of sugar in the blood increased after the meal, to rise again as it diminished later; (2) concurrent curves, where the rise and fall in the blood sugar after the meal were associated with a corresponding rise and fall in the difference value, starting from a normal fasting level; (3) unrelated curves, in which the difference value was normal in the fasting state, but rose to an unusual level several hours after the test meal, generally as the percentage of sugar is falling. The first type was characteristic of deficiency of the internal secretion of the pancreas, the second was met with where there was hyperactivity of the thyroid, pituitary, or other ductless glands, and also in disturbances of the nervous system; the third group embraced cases where defects in the storage powers of the tissues, and particularly of the liver, for carbohydrate existed. Various combinations of these types were met with, and particularly a combined concurrent or unrelated curve with a pancreatic curve, for it would seem that deficiency of the internal secretion of the pancreas eventually developed in all untreated cases of persistent hyperglycaemia, whatever the initial cause might be. Taking a consecutive series of 250 cases it was found that there was a pancreatic factor in 202, or 80.8 per cent., but that in only 114, or 45.6 per cent., was pancreatic deficiency the sole cause of the glycosuria and hyperglycaemia; in another 69, or 27.6 per cent., the liver was apparently mainly at fault, and in 61, or 24.4 per cent., simple concurrent curves were found; in addition, there were 6 cases (2.4 per cent.) of "renal glycosurias" showing normal relations between the curves.

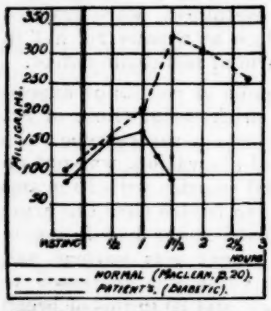
These findings were of more than theoretical interest; they had an important bearing on treatment, for it was well known that the Allen fasting treatment was based upon experiments with depancreatized dogs, and the benefits arising from the use of insulin in diabetes were due to the supply of the internal secretion of the pancreas introduced into the circulation at each injection. So long, therefore, as there was a pancreatic element in the condition they should expect improvement to result from fasting or insulin, and if the pancreatic deficiency was due to functional and not organic changes in the gland permanent benefit would follow; but if the hyperglycaemia was associated with advanced destruction of the elements forming the internal secretion of the pancreas or was entirely dependent upon non-pancreatic causes permanent benefit would not be induced either by fasting or insulin, however long continued. His experience with the fasting treatment tended to support these conclusions, and, although it was as yet too early to make definite statements regarding insulin, it seemed probable that they were equally applicable.

Insulin might be used in the treatment of diabetes in three ways: (1) as a temporary aid to metabolism in emergencies, (2) to enable the patient to take a diet permanently in excess of his natural tolerance, (3) as a remedial measure. In the treatment of diabetic coma, in the control of serious acidosis, and as a prophylactic in surgical procedures, insulin was of inestimable value. It was also of great assistance as a permanent aid to the defective metabolic power of patients who without its help were unable to take a bare maintenance diet; but its use merely in order that a luxury diet might be indulged in, as was now very commonly the case, was both wasteful and unscientific. Excepting in emergencies and in special circumstances insulin should be employed solely as a remedial agent and only in properly selected cases and under carefully controlled conditions. By means of the diagnostic methods to which he had referred it was possible to determine whether a particular patient was, or was not, likely to benefit permanently from the treatment, and so to avoid unnecessary expense and the risk of failure with all its consequences in unsuitable cases. Essentially treatment with insulin was a means by which the effects of fasting might be obtained without the discomforts and dangers attendant upon prolonged abstinence from food, the injections enabling the work of the pancreas to be carried out vicariously and thus providing the physiological rest required for the recovery of its functions. Obviously, therefore, it was best employed in conjunction with the fasting treatment, or some modification of it, as Graham and Harris (*Lancet*, 1923, 204, p. 1150) had suggested. A permanent improvement of the food tolerance was only to be expected in those cases where experience had shown the fasting treatment to be of permanent benefit—that was, mainly in children and young people, where purely functional deficiency of the internal secretion of the pancreas was most commonly met with. Insulin was not a universal cure for diabetes, and he agreed with Joslin when he said (*Journ. Amer. Med. Assoc.*, 1923, 80, p. 1581) that "it is cruel for prominent individuals to make such a statement and arouse false hopes." In his opinion it was the most valuable means at our disposal for controlling defects of metabolism due to deficiency of the internal secretion of the pancreas, but it should not be looked upon as an empirical remedy to be given indiscriminately to all cases at present generally classified as diabetes. When its limitations and dangers, as well as its sphere of usefulness, were realized it would no doubt take its true place as a powerful aid in helping the recovery of a special form of metabolic defect.

Dr. GEORGE GRAHAM (London) spoke of results of experiments on patients in the medical professorial clinic of St. Bartholomew's Hospital. One patient, a severe type, who was always passing sugar in spite of starvation, was put on a diet of protein and fat up to 1,360 calories with 16 grams of sugar in the form of vegetables. In twelve days the urine was sugar-free and the morning blood sugar had fallen to 0.20. After six weeks the blood sugar was normal and remained so, although the calorie value was increased to 2,000 with additional protein and fat, and 80 grams of bread were tolerated. So far 20 cases had been treated on these lines; in 17 cases the blood sugar had fallen to normal, while in 3 other cases the blood sugar, although lower than before, had not yet fallen to normal. It was important to keep the blood sugar within normal limits, as Allen's experiments on diabetic dogs had shown that overworking of the β cells of the islands of Langerhans by doses of sugar caused degeneration of these cells. The aim should be to keep the blood sugar normal. The blood sugar should fall below 0.08 per cent. each day so as to rest the pancreas as much as possible. The results in cases of coma were so far good, two cases out of three having recovered; the third, who had a large abscess of the parotid, died three hours later in spite of 30 units of insulin; sepsis should always be thought of, as another case of coma had an acute otitis media. The dose of insulin varied in different patients; some would respond rapidly to 10 to 15 units, whereas others would need 40 to 60 units, and this could only be determined by cautious trial. Blood-sugar determinations were of assistance, but were not absolutely necessary. So long as sugar was present in the urine blood sugars could be dispensed with, but when the urine was sugar-free it was important to make estimation of the blood sugar occasionally as there was no other means of telling whether the blood sugar was 0.10 or 0.18 per cent. For blood-sugar estimations at this stage the blood should be collected either immediately before the insulin injection or about twelve hours after the last one. It was better to estimate the blood sugar as soon as possible, but the blood might be collected and preserved by the addition of potassium oxalate and one drop of 40 per cent. formalin per 5 c.cm.

Dr. J. A. NIXON (Bristol) said that it was a memorable occasion, which would mark the Portsmouth meeting in the history of the British Medical Association. They would be able to say, "I heard Dr. Banting's address on insulin." He proposed to take advantage of his presence to get enlightenment for his own ignorance. He had treated only

five cases of diabetes with insulin, and allowing for a large measure of enthusiasm it had appeared to produce almost magical effects. Dr. Banting seemed to have already answered one of his questions: Was a patient any better off for being sugar-free if the blood sugar remained considerably above normal? Such a patient might be metabolizing more carbohydrate and gaining in weight and well-being, but with hyperglycaemia was he safe? Possibly if it had been ascertained that glycosuria occurred with a low blood-sugar threshold, they could make use of a trace of glycosuria as the guide to insulin dosage. Dr. Banting had advocated Woodyatt's "basal requirement diet." Dr. Nixon had found that a most practical standard diet. It enabled them to adjust the insulin dosage to a diet which was adequate. Moreover, Woodyatt's formula for calculating the proportion of fat to carbohydrate and protein had proved most useful. As an example, a woman with glycosuria on whom the surgeon wished to perform myomectomy was rendered sugar-free in the urine by diet, but had a high degree of acetonuria. The diet was recalculated, so that the fat was equivalent to twice the carbohydrate *plus* half the protein. In three days she was acetone-free and the operation was successfully performed. He had had an example of the personal factor in tolerance of insulin. A man, aged 29, was rendered sugar-free (in the urine) by complete starvation, but he developed glycosuria on a diet containing only 300 calories. He was given 5 units of insulin during starvation and he was not given a meal until one and a half hours later. Before this meal his blood sugar was again estimated. His fasting blood sugar was 0.3 per cent. One and a half hours after insulin, while still starving, his blood sugar was 0.29 per cent. This man was ultimately enabled to take a diet containing 1,678 calories with a daily dosage of 40 units of insulin injected as 20 units twice a day.



Blood sugar after 50 grams of glucose by mouth.

The symptoms due to overdosage of insulin were difficult to determine. A man of 40 receiving 20 units of insulin daily for three days developed sudden partial aphasia; he was given glucose before his blood sugar could be estimated. By the next day his aphasia had practically recovered; but this patient had previously shown symptoms of angina pectoris. This case rather frightened him, but he was not convinced that his aphasia was due to insulin. Another man, aged 35, receiving 20 units of insulin daily, told him that since the injections his feet suddenly become swollen at night and he felt tinglings in his legs; but this patient's blood did not show hypoglycaemia. A girl, aged 14, presented an example of the difficulty occasionally experienced in deciding whether a patient was a true diabetic. Five weeks before she came under observation she complained of thirst, polyuria, weakness, wasting, and glycosuria. She was put on a diet before her blood sugar was estimated. The glycosuria disappeared and her blood sugar was no more than 0.13 per cent. In hospital her blood sugar fell to 0.8 and 0.75 per cent., although she was supposed to be taking 7 ounces of bread a day. She had also ketonuria. She was tested with 50 grams of glucose, given by mouth, and her blood-sugar curve was characteristic of true diabetes. Then she admitted that she had been afraid to eat the bread permitted in her diet. Ultimately she was found able to take a diet containing 3,000 calories; her blood sugar remained about 0.1 per cent., and she had been sent home as not needing insulin treatment. She was a potential diabetic with a high sugar tolerance. An excessive indulgence in chocolate had produced her first symptoms of diabetes.

Dr. J. K. RENNIE (Glasgow) said that the treatment of diabetes had undergone so marked a change during the past few years that a consideration of the results obtained under the various methods of treatment was not without interest. The following figures were obtained from the records of admissions to Dr. Cowan's wards in the Glasgow Royal Infirmary, and covered a period of thirteen years. For convenience he had divided the cases into (1) old, (2) Allen, (3) insulin, the terms applying to the type of treatment adopted in each group. So far as possible only cases of undoubted diabetes had been included, but as all the "old" and a few of the "Allen" cases were under treatment before the routine use of blood sugar and glucose tests the records in these groups were necessarily less trustworthy. Needless to say, information had been received from time to time of the subsequent death of many of these patients, but as much of that information was unreliable it had been disregarded. Only cases which died in hospital were included in the following table:

	Patients Treated.	Improved.	Stationary or Worse.	Died.	Mortality.
1. Old	49	29	12	8	16.3%
2. Allen... ...	47	39	6	2	4.1%
3. Insulin ...	10	10			

1. *"Old" Cases.*—This group included all cases treated under the various dietetic régimes in vogue before the introduction of the well known starvation methods of Allen and of Graham. A reference to the ages of the "improved" group showed that 11 cases were under 35 years of age, while in the stationary group 9 of the 12 cases were under that age, and 3 of these under 20. Of the deaths all 8 occurred in coma; 7 of these patients were under 35, 4 under 20.

2. *"Allen" Cases.*—Forty-seven cases were treated on "Allen" lines, and an improvement, more or less marked, occurred in 39. In this group, however, the average age was rather less than in the corresponding group of "old" cases, 17 being under 35 years. Of the 6 cases in the stationary group 3 became dissatisfied with restricted diet and left hospital irregularly, a happening which was becoming increasingly less common—probably the only good result of the publicity which the treatment of this condition had received of late in the public press. One case had a progressive pulmonary tuberculosis on admission and went to a sanatorium; and one, a girl of 17, suffered from mitral disease with failing compensation. The sixth case, an elderly man with long-standing diabetes and gangrene of the toes, made no progress under treatment. Of the two patients who died, one was admitted with air hunger, and died in coma in thirty-six hours. The second case was that of a youth of 17 in whom symptoms had first manifested themselves five weeks prior to admission. He was poorly nourished, but bright and alert, and nothing abnormal was found on physical examination. The urine contained sugar in amount, acetone was present, but there was no reaction with tinct. ferri perchlor. A liberal carbohydrate diet was ordered, but he had little appetite and took only about carbohydrate 30, protein 36, and fat 50 in twenty-four hours. Thereafter he became somewhat restless and drowsy. Thirty-six hours after admission he suddenly collapsed, the pulse becoming imperceptible. He recovered slightly under stimulation, but improvement was transient and he died ten hours later. At no time was there any suggestion of air hunger, the breathing throughout being easy, regular, and natural. A positive tinct. ferri perchlor. reaction was never obtained in any sample of urine. Another case seen more recently, a man aged 50, gave a history of having taken little food for three weeks prior to coming under observation. The urine contained much sugar but no acetone or diacetic acid; the blood sugar was over 0.4 per cent. There was some twitching of the muscles of the neck and upper chest and the breathing was slightly Cheyne-Stokes in type. The pulse was rapid and of poor quality. Despite stimulation, liberal carbohydrate, and insulin in large doses he died, apparently of cardiac failure, thirty-six hours later. Cardiac failure was certainly an important factor in these cases and was a complication for which one must watch in all severe diabetics. Two of the cases admitted for insulin treatment showed signs of cardiac weakness, so that the routine "starvation" diet until sugar-free had to be stopped and replaced by feeding *plus* insulin.

From the figures quoted it would be apparent that an improvement might be looked for in the great majority of cases treated by the "Allen" method, a result quite in accordance with that of all others by whom it had been employed. But while the immediate prognosis was good, experience had shown that in hospital patients the end-results were far from satisfactory. It was rare to find a patient of that class who did not lose ground after discharge from hospital. Almost all who had been readmitted had shown a distinct loss of weight and a decreased carbohydrate tolerance, not infrequently accompanied by thirst, polyuria, etc. Unwillingness to adhere to the diet was responsible in many cases; but an inability to understand the rationale in some and the conditions of life, particularly at the present day, in others made it very difficult, even for those who were most anxious to keep well. Among private patients the prognosis was, of course, much better. It should be remembered that it was necessary to insist upon these patients reporting for examination from time to time. It was not uncommon to find a zealous patient grossly underfeeding himself without regard to his general condition in an endeavour to remain sugar- and acetone-free at all costs. One patient, a woman of 35, who had been under treatment two years before with good results carried on unaided until six months ago, when a recent but persistent cough and spit again brought her under observation. She confessed to long periods of semi-starvation with deliberate loss of weight, but she was proud of the fact that she had remained sugar- and acetone-free. The general condition had greatly deteriorated and there was an obvious tuberculous lesion at the right apex.

3. *Insulin.*—Ten cases had been treated with insulin and the result in each case had been a distinct improvement. All save two were cases of severe prolonged diabetes. With one exception they had all previously been in the wards under "Allen" treatment, four of them on more than one occasion. It was originally intended to put each patient upon what had been his optimum diet when last dismissed from hospital, but all had retrogressed considerably and this procedure could not be followed. Four cases, however, commenced treatment in this way, but in each case it was found that there was a considerable reduction in the carbohydrate tolerance, much sugar in the urine, some acetone and a high blood sugar. All had lost weight. An effort, not always successful, was made to render each sugar-free by starvation methods and thereafter to work up to what was considered a sufficient diet, using insulin to keep the patient sugar-free. The method adopted in determining the requisite dose of insulin was, briefly, as follows. To each patient was given a meal of known carbohydrate, protein, and fat content, called a "fixed meal," with increasing doses of insulin, and this procedure was continued until satisfactory blood sugar and urinary sugar results were obtained. From the information thus obtained a sufficient dose for an adequate diet was calculated in each case. A chart showed the effect of such a meal—carbohydrate 20, protein 18, and fat 25—upon the blood and urinary sugar curves obtained by hourly estimations in (1) a normal individual, (2) a diabetic without insulin, (3) a diabetic with insulin, in that particular instance 10 units. The fall in the curves in (3) was very striking. This method of treatment was most suited to chronic cases with a low carbohydrate tolerance. These patients were kept under their best weight and the blood sugar tended to run above normal limits. Two patients, adjudged to be cases of comparatively recent origin, were treated on the usual "Allen" lines, but the carbohydrate tolerance was low and acetone readily appeared in the urine. Sufficient insulin was given to keep the patients sugar- and acetone-free with a normal morning blood sugar and at a reasonable weight. This method, on the lines of that described recently by Graham and Harris, seemed to be most satisfactory in "early" cases. Four cases showed so pronounced a degree of acidosis that insulin administration with abundant carbohydrate had to be commenced at once. In these patients the urinary sugar was entirely disregarded during the earlier treatment, attention being directed to the urinary acetone and diacetic acid, the alveolar CO_2, and the ammonia-nitrogen ratio. Large doses of insulin, 40 to 60 units in the day, were given, the results being controlled by blood-sugar estimations 3½ to 4 hours after injection. In no case did any untoward symptoms follow such doses at this stage of treatment, and it would appear that so long as sugar and acetone were present in the urine the estimation of the blood sugar was unnecessary. When rendered acetone-free the treatment of these patients followed lines similar to that of those described above. All patients treated by insulin increased in weight, the gain varying from 1 to 8 kilograms. All showed a very definite improvement in general condition, mental as well as physical. In all save one case, sugar and acetone rapidly disappeared from the urine, the acetone sometimes with dramatic suddenness. The exception was a man admitted with marked acidosis, to whom insulin was given in large doses, but the urine was not rendered acetone-free for twenty-one days nor sugar-free for thirty-eight days. Attempts subsequently to reduce the dose of insulin in that case had always been followed by a return of sugar and acetone to the urine. He would appear to have no pancreatic tissue capable of recovery. A typical result of treatment was illustrated by another chart, which represented the later period of residence of a patient who on admission had shown 85 grams of sugar, much acetone and diacetic acid on a diet of carbohydrate 60, protein 25, and fat 5; he weighed 51 kilos. With an initial dose of 30 units of insulin and gradually decreasing doses he was kept sugar-free and acetone-free for twenty-two days upon carbohydrate 90, protein 80, and fat 100. During that time the blood sugar fell from 0.35 per cent. on admission to 0.10 per cent. fourteen days later, and thereafter the pre-breakfast blood sugar remained within normal limits. The dose of insulin was reduced to a single morning dose of 5 units upon an unchanged diet, but at that point the patient began to add unauthorized carbohydrate to his diet, and sugar appeared in the urine. Home circumstances compelled him to leave hospital, but subsequently he was able to continue on a diet of carbohydrate 80, protein 80, and fat 100, with a weekly starve day, without insulin, sugar- and acetone-free. His weight on dismissal was 52 kilos. The chart showed an undoubted increase in carbohydrate tolerance as the result of insulin treatment. It might be argued that a similar result could have been obtained in this case by "Allen" treatment alone, but on previous admissions the patient had shown a decreasing carbohydrate tolerance and a general downward tendency. So satisfactory a result would have been most improbable.

The effect of insulin had been to allow restoration of pancreatic function, but this would seem to occur not only in cases treated on low diet and with a normal blood-sugar level, but also in those who for one reason or another were given a full diet with larger doses of insulin and in whom the blood sugar was above normal. He had seen this strikingly illustrated in one private case so treated in which symptoms of hypoglycaemia had led to a gradual reduction of insulin dosage without increased urinary sugar and with very considerable general improvement. The morning blood sugar in this case was 0.18 to 0.22 per cent. and the diet had remained unchanged. A third chart contrasted the results of "Allen" and insulin treatment in a telegraph boy, aged 13, first admitted three years before. The acetone, blood sugar, urinary sugar, weight, and dismissal diet were charted in that order. It would be seen that the first period of treatment was very satisfactory. The second period, two years later, was not so good, although the urine was rendered sugar- and acetone-free and the patient gained slightly in weight; but the dismissal weight did not equal that of two years previously in a growing boy. The carbohydrate tolerance, too, had considerably decreased. His third stay in hospital six months later was entirely unsatisfactory. It was now found impossible to prevent his adding to his diet, and he was dismissed irregularly with acetone and sugar in the urine and his carbohydrate tolerance never discovered. The blood sugar, however, was brought below 0.15 per cent. In March of this year the patient was readmitted to hospital. He was now 16 years old and terribly emaciated, weighing only 24.5 kilos (3 st. 11 lb.). The blood sugar was 0.5 per cent. The urine contained acetone and diacetic acid and was loaded with sugar. He was incapable of moving himself in bed, all the reflexes were absent, and the skin was so tightly stretched over the bones that great difficulty was experienced in administering the comparatively

large injection of insulin which alone was available at that time, even over the abdomen. To-day, as the result of prolonged insulin treatment, the boy was running about the ward and in appearance compared not unfavourably with many of his fellows. His weight was now 32 kilos (5 st. 8 oz.), diet carbohydrate 70, protein 80, and fat 100, insulin dosage 30 units a day, and he was sugar- and acteone-free with a blood sugar of 0.15 per cent.

All results proved abundantly the great value of insulin in acutely ill patients. It would seem to hold out hope of cure in "early" cases and undoubtedly it alleviated the lot of the more chronic. Unfortunately the treatment was expensive, and for hospital cases the "Allen" treatment must remain for the present the most useful despite its somewhat unsatisfactory results. It was a doubtful kindness to a patient to assure him that a diet had been found for him which would keep him well and satisfied provided he obtained a drug which he was unable to afford and whose administration was outwith his capabilities. In conclusion, Dr. Rennie referred briefly to another chart, which illustrated one of some experiments which were made in the administration of insulin by inunction following Telfer's rabbit experiments recently recorded. The chart showed the blood-sugar curves obtained in a diabetic following a meal (*a*) without insulin, (*b*) with insulin injected in the usual way, (*c*) with insulin inunction. No reduction in blood sugar was found, a result confirmed on other occasions both with an ointment of crude insulin prepared by Dr. Telfer and similar to that used by him on rabbits and with other preparations. No dose of insulin which Dr. Rennie was able to give in that way—and he had endeavoured to give 100 units in one inunction—produced any effect upon the blood sugar. Insulin appeared not to be absorbed through the skin.

Dr. E. P. POULTON (London) spoke of the effect of insulin on relatively mild cases—those which became sugar-free on diet restriction. An attempt had been made to discover if any increase of tolerance took place after prolonged treatment. The rise of blood sugar was estimated after giving 25 grams of sugar, and the experiment was repeated after a period of treatment. The quantity of the diet was chosen so that in-patients felt satisfied; about 40 calories per kilo was allowed; the protein was about 1.5 grams per kilo, and during treatment the patients were walking about. After receiving 60 units a day for thirty days one case showed a gain in weight, but no evidence of improved tolerance. In one there was distinct improvement, in another perhaps a slight improvement; in one case after eighteen days' treatment there was a slight but definite improvement.

Dr. OTTO LEYTON (London) referred to the probable curative properties of insulin in diabetes mellitus of comparatively recent origin, and due to defect of the pancreas. Many had found that overworking the cells of the islets of Langerhans was followed by progressive degeneration. They had reason to think that whatever cause led to the sudden onset of diabetes mellitus, the destruction of the pancreas was, as a rule, not complete; some cells survived unchanged, some were destroyed, and some had their vitality reduced. Evidence of this consisted in the fact that a dog with a small fraction of pancreas, but of healthy pancreas, might be submitted to a general anaesthetic time after time without causing any recognizable deterioration of the pancreas, while the tolerance of the majority of diabetics was decreased by the administration of chloroform, ether, and sometimes of nitrous oxide. When there was a probability that damaged cells were present, it was thought worth while to attempt to nurse them back to health by rest. Rest of the pancreas was procured by giving sufficient insulin to maintain a slight hypoglycaemia. This might lead to symptoms of hypoglycaemia, but these were controlled by the administration of sugar. There was reason to believe that the tolerance of early cases improved. An attempt was being made at the London Hospital to obtain evidence by comparing the curve of the blood sugar while and after giving dextrose intravenously over a period of three hours, before and after a course of treatment.

Dr. A. P. THOMSON (Birmingham) said that he had treated over 30 cases of diabetes with insulin, and he had observed definite increase in tolerance after a period of treatment in two cases that had been previously rigorously dieted for a considerable time. He mentioned these cases specifically, as Dr. Banting himself seemed to doubt whether such a thing could occur. As the result of his experience Dr. Thomson believed that it was quite impossible to treat diabetic patients who could not learn to take care of themselves to a large extent or those patients who lacked the determination necessary for the limitation of their diets, unless, of course, continuous control could be arranged. Hospital practice was frequently disappointing. With reference to the value of blood-sugar estimation in the control of treatment, Dr. Thomson found that it was possible in the average case to get along with very few estimations during the preliminary period of standardization in a nursing home, and that afterwards he had not found them necessary providing the urine was examined frequently enough and that the diet was properly controlled. He believed that the liability to toxic symptoms after insulin decreased with the improvement in the condition of the patient. He mentioned as unusual complications of insulin treatment the occurrence of acute cataracts in a patient who was otherwise doing well and two instances of transient haematuria after large doses. He agreed with Dr. Leyton that the so-called hypoglycaemia crisis frequently occurred when the blood sugar was above the normal, and he believed that the sudden change in level was more important than the exact value.

Dr. F. A. ROPER (Exeter) detailed an incident in the case of a male patient, aged 54, whose general condition, blood-sugar curve after glucose meal, and acidosis estimations showed diabetes of a considerable severity. He had some few months ago had diabetic coma and there was considerable albuminuria. Starvation was badly borne, so that on the fourth day despite considerable glycosuria he was placed on a diet of about 600 calories containing 15 grams carbohydrate, while insulin 20 units per diem was commenced. On the third day of this diet the insulin was increased to 30 units given in three equal doses. The urine was closely watched for disappearance of sugar. On the fifth day the urine at 9 a.m. contained sugar, and the blood sugar on the day preceding was 0.20. Lunch was taken at 1.15 preceded by insulin. An hour later he expressed himself as feeling "very fit." A quarter of an hour later he was found comatose—unconscious—with deep abdominal breathing tending later to become irregular (Cheyne Stokes). From the first he was unable to swallow, and glucose per rectum failing in any way to improve his condition, in fifteen minutes or so 2½ drachms of glucose in a pint of saline were administered intravenously. Ten minutes after commencing the injection he began to yawn, and in half an hour could speak and thereafter quickly recovered. A urinary specimen passed at noon that day was found to be sugar-free, this being the first time it had been sugar-free since he had come under observation. The incident was related (1) in support of the contention that at present all patients requiring insulin should be under hospital conditions of observation and treatment until their basal dietetic requirements and proper insulin dosage had been determined, and (2) as emphasizing the advisability during this initial period of frequent blood-sugar determinations inasmuch as hypoglycaemia in this case supervened within five hours of cessation of glycosuria with a moderate insulin dosage.

LIEUT.-COLONEL E. E. WATERS, I.M.S., asked Dr. Banting if the temperature at which insulin was stored had any effect on its potency; and Dr. CLARKE BEES (Swansea) inquired what instructions should be given to patients on leaving hospital. Should they be sugar-free or discharged with a small degree of glycosuria?

Dr. Banting's Reply.

Dr. BANTING, in reply, said that the cause of deficiency of the islets of Langerhans was not known. Patients requiring continuous treatment were trained to give their own injections. Larger doses of insulin were always

necessary at the outset of treatment. When two doses a day were required the larger should be given in the morning; the ideal dose just corrected the deficiency. It was easier to maintain the balance in long-standing elderly diabetics than in recent cases of the disease in young people. An attempt should be made to maintain the blood sugar at a normal level; a raised blood sugar furnished a stimulus to the pancreas and was to be avoided. When a patient was discharged from hospital in Toronto a long detailed letter was sent to the family physician, but by the time the patient left hospital he was thoroughly *au fait* with the routine.

The symptoms of hypoglycaemia included a feeling of uneasiness of impending disaster and trembling, incoherent speech, sleepiness, and hunger. In children, pallor, a rise in pulse frequency, and sweating were common. The rate of fall of blood sugar was potent in determining the onset of symptoms, which might not occur until the blood sugar reached 0.05 per cent., but it had been recorded as low as 0.032 per cent. before symptoms appeared. If the patient was comatose from an overdose of insulin consciousness was usually restored in two minutes by 10 to 15 minims of adrenaline, given subcutaneously, adrenaline having the power of rapidly turning out glycogen from the liver. When consciousness was restored by this means 10 to 20 grams of glucose might be given by the mouth.

Insulin kept at room temperature retained its potency for at least six months, but Dr. Banting had no knowledge as to the effect of the Indian climate on its activities. He said that there was no reason why diabetic patients should not be treated as well by the general practitioner as the specialist.

SECTION OF VENEREAL DISEASES.

Sir ARCHDALL REID, K.B.E., M.B., President.

DISCUSSION ON PREVENTION AND TREATMENT OF CHRONIC GONOCOCCAL PROSTATITIS AND VESICULITIS.

OPENING PAPERS.

I.—KENNETH M. WALKER, F.R.C.S.,

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CHRONIC GONOCOCCAL PROSTATITIS.

IN opening this discussion I do not propose to deal methodically with the routine treatment of this condition nor to discuss matters on which we are probably all agreed, but rather to select certain points which I believe to be important ones, and which I hope may furnish material for an interesting discussion.

No one will deny that the subject to which we are devoting our attention at this year's meeting of the Venereal Diseases Section of the British Medical Association is of the very greatest importance, not only on account of the complications which may arise during the course of a chronic prostatitis, but also because of the difficulties which we encounter in its treatment. The prostate furnishes for organisms an easy gate of entry into the blood stream, with the result that practically any structure in the body may become the seat of a metastatic lesion. Personally I am of the opinion that from an infected prostate a spread of organisms may take place by means of the lymphatics as well as by means of the blood stream. This opinion is based on an investigation I carried out a year ago on the subject of the lymphatic spread of infection after the operation of prostatectomy. By cutting sections and staining for organisms in the tissues I was able to trace the course of infection in fatal cases of prostatectomy by following the infecting organisms from their point of entry in the lymphatic spaces of the prostatic capsule to their arrival in such situations as the epididymis, the periureteral lymphatics, and the capsule of the kidney. While not wishing to suggest that the patient who has been left with a torn and infected capsule after the operation of prostatectomy is entirely comparable to the patient suffering from a chronic prostatitis, I think that the analogy is sufficiently close to render it probable that in addition to the spread of infection from an infected prostate by means of the blood stream infection may also be carried by the lymphatics. This spread, as we all know, is particularly common in the direction of the epididymis, but I believe that if a careful look-out be kept in all cases of prostatitis it will be found that infection of other portions of the genito-urinary tract is not so uncommon as is sometimes presumed. For example, if a microscopic examination of the urine be repeatedly made in all cases of chronic prostatitis renal casts will not infrequently be found for a short period of the disease, indicating that a transient infection of the kidney has occurred. This infection is rarely gonococcal but due rather to secondary organisms.

Chronic prostatitis, as the title of the subject for this year's discussion suggests, is almost invariably associated with a certain degree of infection of the vesicles. In this connexion I should like to point out an error in diagnosis which I believe to be a common one, and that is the error of labelling what is mainly a case of vesiculitis one of prostatitis. This mistake is in great part due to the anatomy books, in which the vesicles are described as two obliquely placed sacs that start at the mid-point of the upper border of the prostate, and pass upwards and outwards at an angle of from 30 to 45 degrees to the horizontal. A dissection of half a dozen bodies in the *post-mortem* room will be sufficient to convince anybody that the vesicles do not occupy the oblique position generally ascribed to them, but are *horizontally* placed organs lying along, and for the most part in intimate contact with, the upper border of the prostate. As a result of this close relationship with the prostate it is extremely easy for the examining finger to mistake the induration of a vesicle for an induration of the upper part of the prostate, and I have frequently found cases diagnosed as chronic vesiculitis which in my opinion were clearly cases of chronic prostatitis. Fortunately the treatment of the two conditions is in the main the same, so that the error in diagnosis is not of such importance as it otherwise would be.

TREATMENT.

I suppose that we are all agreed that of the therapeutic measures available for the treatment of chronic prostatitis prostatic massage is the most important, so that I may be pardoned if I dwell at some length on this subject. Massage of the prostate from the rectum achieves three objects:

1. It empties the prostatic follicles of inflammatory products, and thus assists in the drainage of that organ.
2. It brings fresh blood and lymph to structures that are the seat of chronic inflammation, and hastens processes of repair.
3. It drenches the blood stream with antigen and provokes a reaction similar to that produced by the injection of a vaccine.

As these points are of the greatest practical importance in the treatment of chronic prostatitis they will be considered in further detail.

I believe that it is generally supposed that the action of prostatic massage in emptying the prostatic follicles is a direct one—that is to say, that the finger directly expresses the accumulated contents of the gland. However, I am one of those who subscribe to the view that this is not the case, but that the emptying is mainly accomplished by the contraction of the muscle fibres surrounding the follicles. The prostate is a gland remarkably rich in muscle fibres. These are arranged circularly around the fundus of the prostatic glands and longitudinally in the neighbourhood of its duct, so that they are ideally disposed for the emptying of the gland. The fact that the muscle of the prostate is stimulated by the massaging finger is sometimes shown clinically by the sudden hardening of the prostate that is felt during massage. It is obvious that emptying of the glands will be accomplished much more effectively by the co-operation of the muscles than by the mere mechanical pressure of the massaging finger, and for this reason the question of whether the muscle of the prostate contracts during massage is not one of merely theoretical interest.

If emptying of the follicles is best accomplished by the action of the prostatic muscle, one is tempted to speculate whether a stimulus cannot be employed that is more effective than the massaging finger. I do not refer to such

mechanical masseurs as have been introduced as a substitute for the finger; for we are probably all agreed that nothing is so effective for the carrying out of massage as the finger. I refer rather to electrical stimulation of the prostate by means of an electrode placed within the rectum. An excellent electrode for this purpose is that which has been made for me by Messrs. Schall, according to instructions supplied by Dr. E. P. Cumberbatch. It consists of a metal spoon with rounded edges mounted on a vulcanite rod and with a screw for attachment to the source of electricity. Although a static machine, such as the Wimshurst, is probably the best source of current for use with this electrode, a more convenient one is the physio-faradic wave apparatus, supplied by the Medical Supply Association, which gives a slowly interrupted faradic current, the interruptions being spaced at intervals of about one per second. This instrument is at present in use in the venereal department of St. Bartholomew's Hospital for the treatment of cases of chronic prostatitis. It is employed in certain cases as a substitute for prostatic massage, with very satisfactory results. Its efficiency is shown by the amount of secretion that appears at the meatus during its use. The precise action of the current is, however, a matter of doubt, for it is generally agreed that a faradic current has no direct action on unstriped muscle. If this is so one can only suppose that the stimulus to the contraction of the prostate is supplied by the vigorous action on the striped muscles in its neighbourhood. However, it is interesting to note in this connexion that Wallace has asserted that in addition to unstriped muscle the prostate contains a small amount of striped muscle. In spite of the somewhat alarming appearance of the electrode the treatment is not in the least distressing, and the discomfort experienced is very little greater than that usually complained of in the case of digital massage. I am aware that others have tried electric massage before me, notably Hogg and Courtride, and that the majority of those who have experimented along such lines have ended by abandoning electrical in favour of digital massage. Nevertheless, I am convinced that massage of the prostate is of such overwhelming importance in the treatment of prostatitis that no efforts should be spared to explore every possible method of carrying it out, and I mean to persevere with the treatment.

That massage of the prostate causes an absorption of bacterial products by the blood stream is rendered evident by the reaction that follows it. This reaction is generally noted on the two days following the treatment, the patient complaining of lassitude, headache, fever, increased local discomfort, and, where the prostatitis is associated with chronic rheumatism, of an increase of pain in the joints. On account of this it is advisable when vaccine therapy is being employed, as well as massage, to arrange that the injection of the vaccine does not coincide with the massage, otherwise a double reaction may be provoked. It is true that all cases do not show this general reaction after massage, but it occurs sufficiently often to show that the massage has an important general action in addition to its local one.

Dilatation of the Posterior Urethra.

Dilatation of the prostatic urethra by large-sized bougies, or by special dilators, is another therapeutic measure that is extensively used in the treatment of chronic prostatitis. The action is generally considered to be a mechanical one, the pressure of the instrument on the prostate resulting in the expression of the retained contents of the follicles. Again I am inclined to differ from the orthodox view, and to express the opinion that the bougie's action is an indirect one exerted through the muscle fibre of the prostate. For this reason as well as for others I am strongly against any attempt being made to dilate the prostatic urethra by means of a Kollmann's dilator, or by any other instrument than a bougie. No instrument has yet been invented, or is likely to be invented, that is capable of dilating so irregular a cavity as that of the posterior urethra, and the use of a curved Kollmann for the purpose can only result in trauma.

I am inclined to think that already a reaction is taking place against what I may term the Great Metallic Age of the history of the treatment of gonorrhoea. For the last fifteen years the ingenuity of urologists has been employed on the invention of a whole armoury of instruments for the detection and treatment of urinary conditions, and the gonococcus has been ruthlessly pursued by the enthusiastic inventors of various forms of urethroscopes, dilators, electrical cauteries, electrodes, flushing bougies, and a host of other instruments. But the more closely one keeps in touch with the pathology and bacteriology of gonococcal infections the more forcibly it is impressed upon one that final victory over these infections will not be achieved through the instrument-maker but through the biochemist or the bacteriologist. Far be it from me to underrate the value of urethral instruments in the precise diagnosis and treatment of the more superficial lesions of gonorrhoea. I would even concede that they are of service in the treatment of more deepiy placed infections such as prostatitis; but while recognizing the aid they lend, I am convinced that there is a very grave danger at the present time of employing instruments too freely, especially in the case of posterior infections, and of thereby actually prolonging the course of the disease we are attempting to cure.

Treatment through the Blood Stream.

Under this heading I would include such measures as vaccine therapy and the use of intramuscular or intravenous injections of drugs. Of vaccine therapy I cannot speak with any great enthusiasm, although, like everybody else, I have had cases which have undoubtedly received benefit from the use of an autogenous vaccine. In those cases in which prostatic massage produces a reaction I do not as a rule use a vaccine, as I consider that massage is an excellent substitute. It is in the very chronic and stubborn case in which a reaction does not occur after massage that the use of a vaccine is specially indicated, and in the same type of case I not infrequently employ "shock therapy." We have probably all had cases of this description which have improved materially as the result of an added infection such as an attack of influenza, and I am sure that "shock therapy" has a definite sphere of utility in the treatment of chronic prostatitis.

Of the various drugs that have been employed in the treatment of chronic prostatitis I can only speak from personal experience of sulfarsenol and of silver-salvarsan. The results obtained from their employment in obstinate cases, and especially in cases complicated by rheumatism, have been such as to encourage me to continue their use, for it is by working along such lines and by increasing one's knowledge of the bacteriology of gonococcal infections that I anticipate that future progress will be made.

Diathermy.

At the last meeting of this Section I reported favourably on the use of diathermy in the treatment of gonococcal infections of the cervical canal. Since that time we have turned our attention in the venereal and electrical department of St. Bartholomew's Hospital to the use of diathermy in chronic prostatitis. The applications have been made by means of the spoon-shaped rectal electrode already described. The cases submitted to treatment have been those in which the gonococcus was either present when treatment started or had been found at some previous date. The majority of cases suffered from rheumatism as well as from chronic prostatitis. The results, on the whole, have been very satisfactory, and have already been published by Dr. E. P. Cumberbatch. Some of the cases were referred to the electrical department on account of the joint affections alone, but it was found that improvement in the joints was more rapid if the prostate was treated at the same time. Indeed, in certain cases diathermy to the joints was abandoned and attention wholly centred on the application of diathermy to the prostate. The treatment has the advantage of being painless, and even when it fails, as it certainly does in many cases of staphylococcal infection, no harm has been inflicted on the urethra. Throughout the treatment a thin mucoid discharge occurs from the urethra, but this generally disappears after the applications have ceased.

Surgical Measures.

Although the vast majority of cases of chronic prostatitis yield finally to the above-mentioned methods of treatment, I can recall some five or six cases encountered during the last twelve years in which I have had to have recourse to

the operation of prostatotomy. Exactly why the incision of inflamed tissues should bring about a cure may not be readily explicable, but incision undoubtedly has a place, although a very small place, in the treatment of chronic prostatitis. In three out of the five cases referred to a small pocket of pus was found in the substance of the prostate, and the beneficial action of drainage was easily explained.

CONCLUSIONS.

Before I close I would again draw attention to the fact that in the preceding remarks I have not attempted to summarize the treatment of chronic prostatitis, but have contented myself with bringing forward certain points which I hope may serve as a basis for a discussion. I am fully aware of the fact that I have not even mentioned such important subjects as the prevention of prostatitis, the avoidance of complications, and the general treatment of the patient. Nor have I touched on that vital question, the standard of cure—a question that is certainly of paramount importance and one on which I shall look forward to hearing others speak. I have long been convinced that the value of these meetings lies in the discussion that follows rather than in the introductory paper, and I am sure that this year's meeting will prove no exception to the rule.

II.—DAVID WATSON, M.B., C.M.GLAS.,
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GONOCOCCAL VESICULITIS.

My duty to-day is to introduce the subject of the prevention and treatment of gonococcal vesiculitis. The question of prevention resolves itself into the proper treatment of the primary urethral infection. If infection of the vesicles occurs after treatment has been begun, that method of treatment has failed in one of its essentials—namely, in the prevention of complications. It is therefore necessary to discuss the principles involved in the local treatment of gonococcal urethritis.

Let us consider first those cases which come under treatment apparently before infection of the posterior urethra has taken place. We are at once faced with the important question, Are we justified in relying upon local treatment applied only to the anterior urethra? Two main difficulties, it seems to me, prevent us from following that course. First of all, there is always some uncertainty as to the freedom of the posterior urethra from infection. There is an incubation period after implantation of the gonococcus in the posterior urethra, during which no recognizable signs present themselves. By the time pus is present in quantity sufficient to show in the second urine glass, a posterior urethritis is well established, and quite possibly the gonococcus is already within the vesicle. Then again, are we aware of any method of purely anterior treatment which not only will cure an anterior urethritis but will prevent backward spread? I cannot say that I am. It is always with reluctance and only when forced by the patient's circumstances that I prescribe treatment limited to the anterior urethra. While it is successful in the majority of chosen cases, there is a considerable percentage in which it fails to prevent infection of the posterior urethra, and then, the posterior infection being untreated, the risk of complications is increased.

Prevention of vesiculitis is, to my mind, prevention of posterior urethritis, and this I believe can be ensured once the anterior urethra has become infected only by local preventive treatment applied to the mucous membrane of the posterior urethra. All cases of gonococcal urethritis coming under treatment should as a matter of choice be subjected to treatment by the *grand lavage* of Janet. An antiseptic should be used which has been proved to be gonococcicide in a strength which is unirritating, and the lavage should be carried out at intervals which will maintain the mucous membrane in a state resistant to the gonococcus. Have we an antiseptic available which will satisfy these conditions? I think it will be generally admitted that potassium permanganate does so in strengths of from 1 in 8,000 to 1 in 4,000, applied at first every twelve hours in the weaker solution, and later every twenty-four hours in the greater concentration. My own preference, both from laboratory and clinical experience, is very strongly in favour of acriflavine, using 1 in 4,000 in physiological saline once in twenty-four hours. Experience has taught me that if this treatment is properly carried out and if the patient follows instructions as to his general conduct, extension of the infected area can be prevented almost with certainty, and that a posterior urethritis with its risk to the vas and vesicle will not occur.

It is true that with *grand lavage*, in spite of previous cleansing of the anterior urethra, gonococci would probably be carried into the posterior urethra and bladder, but they will be only in small numbers and intimately mixed with a gonococcicide solution, and the great majority, if not all of them, will be expelled when the bladder is emptied at the end of the treatment. Should any gonococci remain within the posterior urethra, they are in contact with a mucous membrane saturated with a solution which both experiment and experience have shown converts it into a medium unsuitable for the growth of the gonococcus. The clinical test is, however, the crucial one, and experience has proved not only that *grand lavage* is safe in use but that it is the most effective treatment for an anterior urethritis and that it acts as a preventive of posterior urethritis.

Now to consider those cases of gonococcal urethritis which come under treatment after infection of the posterior urethra, I think there is little difference of opinion as to the method of treatment to be adopted. *Grand lavage* is indicated in all except in hyperacute cases. But we can have no assurance that the gonococcus is not already within one or both common seminal ducts, and possibly beyond the reach of the irrigating fluid. It was shown by Low and Oppenheim that reversed peristalsis along the common seminal duct and vas deferens, induced by local excitation of the posterior urethra, is the means by which infection usually reaches the vesicles and epididymis. Infection of the vesicles through the lymphatic or circulatory system is possible, but must be relatively uncommon.

Protection of the whole region from any traumatism is therefore most important. No treatment involving the passage of any urethral instrument is permissible in acute urethritis. The only exception is in retention of urine which cannot otherwise be relieved, and then special precautions must be observed. Rectal examinations must be conducted with the utmost gentleness. The patient must be impressed with the need for protection of the perineum and scrotum from the slightest injury, and should be advised to rest as much as possible. A run on a motor cycle, or any similar excitation, is almost certain to result in conveyance of infection along the seminal duct. In addition to rest, I think atropine is of distinct value. Schindler proved that the tendency to reversed peristalsis can be inhibited by the use of atropine, and insertion into the rectum night and morning of a suppository of 1/100 grain of atropine has for some years been my routine practice in all cases of posterior urethritis. I have now much confidence in relying on the atropine to prevent complications. I find almost invariably that where vesiculitis or epididymitis develops in cases under treatment the use of the atropine suppositories for one reason or another has been neglected.

To recapitulate, the main point in prevention of vesiculitis is the adoption of a suitable treatment for the urethral infection, and in my experience the best has proved to be *grand lavage* with 1 in 4,000 acriflavine combined with the use of atropine, and, of course, protection from injury.

As to the treatment of vesiculitis, the means at our disposal may be divided into expectant and operative measures. In an acute case, rest in bed is essential. Hot sitz baths and hot rectal irrigations are useful for their sedative effect, for relieving pain in the early stages, and also for promoting absorption in the later stages. Diathermy is perhaps the most useful of all methods of treatment. Atropine as a sedative and as a prophylactic to prevent extension to the other vesicle or to either epididymis is also indicated. Vaccines as ordinarily prepared I have found more frequently to be harmful than helpful, but the detoxicated vaccines now available I believe may be used with safety, and occasionally they seem to be beneficial. Antigonococcal serums appear to vary in their qualities and to give unequal results.

We still await the appearance of a safe and reliable specific vaccine or serum. Foreign proteins—electrargol, sulfarsenol, etc.—have been successful only in the hands of a few. But expectant treatment will in the majority of cases bring about a subsidence of the acute symptoms in a week or ten days, and thereafter the vesicles can be treated by regular massage until their expressed contents are free from gonococci and pus. I have already spoken of the important causative factor, reversed peristalsis starting from the posterior urethra. Could not this be used in treatment—for example, might we inject into the posterior urethra an antiseptic sufficiently irritating to set up this reversed peristaltic wave but not strong enough to damage the delicate epithelial lining? This is a suggestion which I have not tried.

Vesiculitis has, in my experience, been a comparatively rare complication. I have been unable to understand the contention, so vigorously maintained by many American writers, that vesiculitis is a constant accompaniment of gonococcal rheumatism. I have found it present only in a minority of these cases, and even then not the vesiculitis, but rather the accompanying prostatitis has proved to be the main disturbing factor, both as regards causation and amenability to treatment. If one compares gonococcal infection of a seminal vesicle with a gonococcal salpingitis, one finds a main point of difference, which is that a gonococcal vesiculitis has not the same tendency to closure of its exit. In salpingitis closure of both ends of the tube and its conversion into a retention abscess is the rule, and while this may occur also in a vesiculitis it does not happen in the majority of cases. In most cases some drainage is maintained during the acute stage, either by overflow or by involuntary emissions, and after the acute stage drainage can be ensured by massaging the vesicles. Even in cases where closure of the vesicle duct does occur the same sequence of events as takes place in salpingitis may be anticipated. After an acute process lasting a week or ten days the pus sac becomes sterile owing to the destruction of the gonococci by the products of their own metabolism, and thereafter absorption of the surrounding inflammatory exudate and of the vesicle contents gradually takes place. This process of repair can be assisted by appropriate treatment—namely, rest, diathermy, hot rectal irrigations, and rectal suppositories of glycerin.

As regards surgical treatment, so far I have not personally encountered a case which demanded it; but just as in gonococcal salpingitis rare cases occur which call for operation in the acute stage on account of the hyperacute reaction, so in gonococcal vesiculitis we may at any time require to operate. This is a very different viewpoint from that of the American writers to whom I have already referred; their preference seems to be for a vesiculectomy or a vesiculotomy whenever a diagnosis of vesicle involvement is made, and some seem to favour an exploratory investigation in all cases of gonococcal rheumatism. A review of published statistics of operation cases has failed to convince me that the results achieved are superior to those we get without subjecting our patients to surgical risks.

One operation requires, perhaps, some special consideration — namely, Belfield's vasostomy for irrigation and drainage of the seminal duct and vesicle. Under local anaesthesia the vas is isolated from the other structures of the spermatic cord, pressed against the scrotal skin, and fixed by passing a curved needle behind it. A half-inch incision is made through the skin and coverings of spermatic cord, the vas is exposed, and a small opening is made into the canal. A blunted hypodermic needle is passed into this minute channel, and a watery solution to the extent of 20 or 30 minims of any desired agent may be injected. The fluid will pass along the vas and distend the seminal vesicles. Belfield maintains that by this method not only can chronic infection of the vesicles be rationally treated, but an impending epididymitis may be aborted or recurrent attacks prevented. The difficulty seems to be to find an antiseptic one or two injections of which will sterilize the infected vesicle without damaging the very delicate epithelium of the vas and of the vesicle sacs.

To sum up, my views on operative treatment are that only on a very rare occasion will it be necessary to drain a vesicle abscess from the perineum; and as regards Belfield's vasostomy—it is an interesting suggestion, but I do not know of any preparation one or two injections of which can be relied on to be effective and non-destructive.

DISCUSSION.

Mr. DAVID LEES (Edinburgh) said:

I have listened with great interest and pleasure to the papers on vesiculitis and prostatitis, and I should like to congratulate Mr. Kenneth Walker and Dr. Watson on their clear presentation of a very difficult subject. Although I am in general agreement with the majority of their views there are one or two points on which my clinical experience is at variance with their views, and one or two questions which I should like to ask. It is, I think, a healthy sign that there should be differences of opinion among scientific workers on any given subject, in that it stimulates us to search for something better in the way of treatment, for most of us will admit that we have not yet reached finality in the treatment of the complications of gonorrhoea even with diathermy. As Dr. Watson has dealt more with the preventive aspect of the subject than Mr. Kenneth Walker it is, perhaps, better to discuss his paper first.

I do not think he stresses enough the function of rest in preventing the extension of the infection from the anterior to the posterior urethra, nor the function of diuresis in establishing drainage of the infected area. Hard work entailing mobility of the pelvic and perineal muscles and the old familiar cotton-wool plug are two of the outstanding causes of posterior urethritis. He spoke also of the value of detoxicated vaccines in the treatment of established vesiculitis, but in my experience these vaccines exercise a greater influence in the early stages in ameliorating the course of the disease and in preventing the onset of complications, and are invaluable in acute gonorrhoea if carefully given and their action in each case watched.

On the question of urethral lavage I am afraid that I do not altogether agree with Dr. Watson, but not chiefly for the reasons which he puts forward—the uncertainty of diagnosing a posterior urethritis during its incubating stage, and the lack of certainty of confining the infection to the anterior urethra by treating the infected area alone. By careful methods it is possible, I think, to diagnose most cases accurately, and in the large majority to confine the infection to the anterior urethra if treated early. My chief reason, however, for differing from him is that in the majority of cases of early anterior urethritis the treatment is carried out by the patient or by a more or less skilled orderly, and I think the trauma to the urethra of unskilled lavage or forcible lavage is a big factor in setting up complications. I have no objection in any case to the *grand lavage* of Janet in competent hands, but until I am satisfied that the patient can do it comfortably and has acquired the art of so doing it, it is better left alone by him in anterior urethritis, except when he is seen at hospital or in the consulting room under expert guidance. I agree with Dr. Watson that in established posterior urethritis it is always an essential, apart from the few hyperacute cases, in which it is preferable to wait for two or three days before commencing it. Of the antiseptics advocated by Dr. Watson I do not find acriflavine any more potent or any less irritating than either alkaline potassium permanganate or albargin, and none of those three is so potent or causes so little irritation as mercurochrome 220, which retains its potency in urine but has the same objection in private work as acriflavine—namely, its staining propensities. Recently I have had quite favourable results with nimi, 1 in 250 to 1 in 500. There is one other point in connexion with lavage which Dr. Watson mentions—namely, the interval between its applications. On the analogy of the eye infection I am strongly of opinion that the more frequent the urethra is washed out in anterior urethritis and the less the pus is allowed to accumulate, the more quickly will you eradicate the infection and the less will be the damage to the surface epithelium if the antiseptic is not too strong.

I am in complete agreement with Dr. Watson as to the value of atropine in treatment, but prefer larger doses, 1/75 grain, and always in the acute stage combine with it

in suppository antifebrin gr. iv in the place of morphine, to relieve pain; in the subacute and chronic cases I combine with it ichthyol mv, to aid in resolution of the perivesiculitis and prostatitis. In some hyperacute cases, for example, with retention or extreme frequency I have found protein therapy of great assistance in giving rapid relief, and have a preference for sulfarsenol, 18 to 24 cg., repeated if necessary in forty-eight hours. The method of artificially reversed peristalsis which he suggests I have tried in two cases and have no doubt that in both the condition was made worse. Like Dr. Watson, I am of opinion that few cases call for either vesiculectomy or vesiculotomy. In some five cases which I have seen, in which the latter operation had been performed, the results were not good, and there are few cases that will not clear up with more conservative methods of treatment. Vasostomy or vasopuncture is a much simpler procedure, and in cases which fail with other methods it is often helpful, if only from the protein reaction to the collargol or other chemical injected. The best operation for vasostomy is Clinton Smith's modification of Belfield's operation.

Mr. Kenneth Walker's paper is replete with important histological, anatomical, and pathological information, and stimulating in the many suggestions it offers for new lines of therapy. Lymph spread of infection is, I agree with him, more common than is generally accepted. The anatomic relationship is an important one, and vesiculitis is often undiagnosed; but as the treatment of prostatitis is on the same lines, and as in quite 75 per cent. of cases both tissues are affected, accurate diagnosis is not an absolute necessity. For accurate diagnosis the knee-elbow position is essential during rectal examination, and during massage and bimanual palpation it is of great assistance. Prostatic and vesicular massage is almost the most important and certainly the least practised method of therapy among the general body of practitioners. In a chronic case with resultant fibrosis the cellular infiltration in and around the prostate lessens the normal and fairly good blood supply, and massage certainly improves this by causing absorption of the deposit. In addition to the three objects mentioned by Mr. Walker, it also improves the general body tone by introducing into the general circulation a better supply of the internal secretion of the prostate. I cannot subscribe to his theory of faradic stimulation of the muscle fibres of the prostate and periprostatic tissues being nearly so efficient as digital massage, which not only acts mechanically but in addition stimulates any striped muscle fibre present. I should like to ask Mr. Walker if he considers the index of efficiency of any method of massage to be the amount of secretion appearing at the meatus subsequently. Is not this dependent more on the position of the patient and on the thorough technique of the operator? There is the added objection to the electric masseur that it is not within the reach of the average general practitioner. It is of interest to find Mr. Walker in one paragraph having a new and rather alarming-looking electrode made for him for therapeutic purposes, in the next faintly damning the Great Metallic Age. Overinstrumentation, especially in posterior urethritis, is no doubt bad, but in diagnosis and in the observation of the effect of treatment the urethroscope is invaluable in the lower genital tract, and in the treatment of the anterior urethra the expanding and flushing anterior Kollmann is a great advance on solid instruments and much more scientific in its method of action. The posterior instrument is not so generally useful. I agree with him, however, that bacteriological methods combined with biochemical hold out a greater hope of finality in treatment and in permanance of cure. I referred to the value of sulfarsenol in acute vesiculitis; in chronic cases I have tried this drug, but not with great success. Non-specific serums and aolan have not been any more successful in my hands. Iodides by mouth and intravenous injections of collosol iodine in combination with prostatic massage are helpful and in conjunction with vaccine therapy will clear up most cases. In chronic vesiculitis and prostatitis mixed infection is so often present that an autogenous vaccine is very helpful, and if possible in a chronic case I combine a polyvalent detoxicated gonococcal vaccine with the autogenous prepared from the prostatic and vesicular contents. The vaccine should, as Mr. Walker states, be given on a different day from the prostatic massage.

The value of diathermy has been emphasized by both Mr. Walker and Dr. Watson; I had the privilege yesterday of hearing Dr. Cumberbatch and Dr. Robinson's excellent papers on their work at St. Bartholomew's Hospital. I was more impressed with the results in mild cases of acute epididymitis than in those of chronic prostatitis and vesiculitis. The results in urethritis of the male were, they admitted, disappointing. What is difficult for me to reconcile is Dr. Cumberbatch's statement that diathermy in the doses given is a mild sedative and does not irritate, with its reputed action in what is essentially a chronic fibrotic condition. There must be, as Dr. Robinson suggests, more than the production of deep-seated heating, and it may be the frequency of the oscillations or it may be the action of the heat on the cellular elements. The important points, I gathered from Professor Russ, were: (1) the strength of the current, (2) the time applied, and (3) the current density, and probably the interaction of all three. It is no doubt a possible and very helpful adjuvant to the treatment of chronic lesions of the posterior urethra, but after discussing it with Dr. Robinson I must say candidly that I am not yet convinced that it will supplant other more simple and time-honoured methods, such as careful digital massage in combination with specific vaccine therapy, which relieves and clears up the great majority of cases.

Mr. A. CAMBELL (Portsmouth) said:

I would like to express my appreciation of the papers read by Mr. Kenneth Walker and Dr. David Watson. We have been given much food for thought and much help in treating such obstinate conditions as chronic prostatitis and vesiculitis. To a large number of our medical brethren these two terms are mere names, and their connexion with metastatic lesions such as iritis, muscular rheumatism, and fibrositis is often overlooked. In my experience a very large number of men from 35 onwards suffer from these complaints, and I think, therefore, the subject is of the utmost importance and we are justified in selecting it for discussion.

I would like to deal with a few practical points in prevention and treatment. In the first place, in spite of all attempts that have been made to find a drug which will attack the gonococcus through the blood stream similar in action to arsenobenzol, at present we have no means in our possession which will cut short an attack of gonorrhoea by a single day. We still have to rely on the natural forces of the body to overcome the infection, and we can only aid them by local treatment. At the same time, we have to apply what remedies we possess in a careful and judicious manner in order not to aggravate the disease and produce the complications we are dealing with to-day. It is well known to all of us that too strong and too violent irrigations frequently have the effect of increasing the severity of the attack. Too early and too vigorous massage may bring on epididymitis and may produce prostatic and vesicular abscess. I have laid down the following rules in treating acute gonorrhoea:

1. Never to force irrigation on unwilling or nervous patients. The urethra in them may be so sensitive that the introduction of a foreign body—which after all every fluid is—may set up severe irritation and congestion of the posterior urethra, favouring an extension of the inflammatory process.

2. Never to attempt posterior irrigation for the first week and not to irrigate at all whilst the attack is in a very acute stage with oedema of the penis or blood-stained discharge. At the clinic, where the patients carry out their own irrigations, they can be trusted generally not to do anything that will cause them pain or discomfort, and I think these should be regarded as certain signs of intolerance.

3. Never to massage the prostate and vesicles for diagnostic purposes until the urine is clear, except, of course, for threads and flakes, and until the discharge has ceased for fourteen days. In the acute stage, when the urine contains a large amount of pus, I merely examine the prostate lightly, and if there are any signs of acute prostatitis or vesiculitis the patient does not irrigate until the acute stage has subsided.

4. Never to pass any instruments into the bladder in a recent uncomplicated case. In the army my experience was 13 per cent. of all cases of gonorrhoea had epididymitis—6.5 before admission and 6.5 after—and many of the cases in the latter portion were due to treatment. By keeping to the rules I have mentioned I very rarely see epididymitis after treatment has commenced.

The symptoms of chronic prostatitis and vesiculitis can almost always be relieved by treatment, but these conditions are practically incurable if the test of cure is complete absence of pus cells in the secretion expressed by prostatic massage. It is possible to divide them into two classes. First there is the man who without symptoms of any kind has pus in the expressed secretion. He gives a history of gonorrhoea some years previously and generally the only thing he complains of is an occasional discharge; or else he wishes to be examined to find out his fitness for marriage. Treatment is essential in these cases, as many of them will develop sexual or urinary disturbances or metastatic lesions later on. For them I prescribe prostatic massage for three months. Although most of them will still have pus at the end of this time, I think the treatment is beneficial and likely to ward off later symptoms. The other class may have a persistent urethral discharge, frequency of micturition, iritis, muscular rheumatism, fibrositis, pain during sexual intercourse, blood-stained ejaculation, and neurasthenic symptoms. Treatment should be continued till these symptoms are cured. The patient should also be instructed to live a careful and regular life, avoiding alcoholic and sexual excess, constipation, and other irregularities. For years I have relied on massage alone, but latterly I have combined it with application of heat by a water-heated applicator in the rectum. Water at a temperature of 120° F. flows from a container through the applicator for twenty minutes. The heat brings an increased flow of blood and lymph to the tissues and a much greater quantity of fluid can afterwards be expressed by quite lightly applied massage. Dilatation of the prostatic urethra by solid instruments or by mechanical dilators is, in my experience, useless, if not harmful. Certainly it is so with a Kollmann's posterior dilator. In the first place, it is only too easy to produce severe damage to the mucous membrane and it does not dilate the urethra. A few years ago I experimented with four blades the same size as those of the Kollmann fixed to the end of a urethroscope. I passed the instrument into the deep urethra and there I saw the mucosa in folds round the blades meeting in the centre of the urethra, but very slight air pressure was sufficient to expand these folds and form a tube. It seems to me that the action of Kollmann's dilator is merely to press certain portions of the mucosa against the deeper firmer structures. I know of two cases where extensive bleeding followed the use of this mechanical dilator.

As regards treatment by vaccines, I do not think that for Class 1 they have any beneficial action at all. I have used ordinary and detoxicated stock vaccines and autogenous vaccines without any effect on the quantity of pus cells obtained in the secretion. For Class 2, with metastatic lesions, I always use Thomson's detoxicated mixed vaccines. The dosage varies for each patient; 2,000 million in one may produce a marked local and general reaction, whereas a much larger dose in other cases has no appreciable effect.

Surgeon Commander PARNELL emphasized the importance of the prevention of secondary injection. He agreed with Mr. David Lees that vaccines (detoxicated) were of most value in the acute early stages. Internally ichthyol (pil. gr. 3 t.d.s.) was of value. Less than 5 per cent. of cases at Haslar had vesiculitis. In metastatic gonorrhoea a chronic glandular prostatitis was more often the infecting focus than vesiculitis. Glandular prostatitis was often asymptomatic, could not be diagnosed by palpation, and was only detected by the microscope. Massage was the great stand-by in treatment—controlled by microscopic examination of the expressed secretions. Sulfarsenol in his hands had shown no appreciable benefits in any metastatic complications of gonorrhoea.

Dr. G. L. EASTES (London) said that he had hoped to have heard the views of bacteriologists on the subject of chronic prostatitis. Vaccines and vaccine treatment had received some hard knocks from previous speakers, but a vaccine to be effectual must be complete. It must include all the secondary organisms as well as the patient's own strain of gonococcus, and in addition, for reasons adduced, the best polyvalent stock gonococcus available; and by the best he wished to emphasize that the age of the stock vaccine should not exceed six months. The secondary organisms must comprise the Gram-positive bacilli so frequently present as well as the cocci. In acute urethritis vaccines were, in his experience, of very great use in effecting a cure without complications.

Dr. JAMES HUDSON (Newcastle) called attention to the frequency with which potassium permanganate was employed in too strong a solution, with the result that the urethral mucous membrane was burnt. In his opinion it should never be used in higher concentration than 1 in 4,000. He had found sodium salicylate of use when given in an alkaline mixture as a means of avoiding such complications as chronic prostatitis and epididymitis.

Mr. KENNETH WALKER and Dr. DAVID WATSON then briefly replied to the questions that had been put to them by the various speakers. Mr. Kenneth Walker agreed with Dr. David Lees that the success of prostatic massage could not be entirely gauged by the amount of discharge that appeared afterwards at the meatus. This amount depended on numerous factors, and sometimes when a patient emptied his bladder a large amount of discharge was found in the distending fluid even although but little had appeared at the meatus.

Sir ARCHDALL REID, in closing the proceedings, congratulated the Section on the excellent discussion that they had listened to, and said he considered that the meeting had been a very great success.

THE VENTRICULAR COMPLEX OF THE ELECTRO-CARDIOGRAM AS A PHYSICAL SIGN IN CARDIAC PROGNOSIS.*

BY

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IT is well recognized that our understanding of cardiac disease requires a sound knowledge of the anatomy and physiology of the circulation, and that without such knowledge it is impossible to interpret rationally most of the ordinary symptoms and signs associated with diseases of the heart. It has been the custom, therefore, to impress upon the student the necessity of understanding thoroughly the physics of the cardio-vascular system. In recent years electro-cardiography has come to be a method of clinical application in most teaching hospitals, and the student, both in the physiological classroom and at the bedside, has to understand what an electro-cardiogram represents. As is usual, the novelty attracts the student, but, I am afraid, also somewhat deters the practitioner when it comes to be a question of the use of such a method in general practice. It has been recognized by most of the medical men who use the electro-cardiograph that its application to-day must be mainly for the purposes of investigation or where an especially full cardiac examination is called for. There is no doubt that, from a prognostic point of view, the electro-cardiogram has a right to be classified as a physical sign of considerable importance. As a physical sign, therefore, the electro-cardiogram has a definite place in the

* Summary of demonstration at a clinical meeting of the British Medical Association at the Royal Victoria Hospital, Belfast, June, 1923.

summation of signs and symptoms which go to make the basis of our prognosis.

After a considerable experience in the use of electro-cardiography as a purely clinical method, some conceptions have seemed to be helpful in conveying to students our ideas as to what exactly is the information we obtain through this galvanometric record. In the first place, it is to be recognized that we have a galvanometric record which represents the summation of all the fluctuations of electric potential that occur between the sites of application of our electrodes. If we consider this fluctuation of potential from the point of view of the electronic theory—which theory is fundamental in modern molecular physics, and is the accepted basis of all practical teaching in "wireless"—we may look upon the electro-cardiogram as representing merely an electronic pulsation in the body. We also must realize that we can pick up this electronic pulsation by electrodes placed on the body in any such position that the heart influences the circuit between them. The electro-cardiogram obtained varies in its form according to the position the electrodes occupy relatively to the heart, but in all cases it is to be remembered that the galvanometric record can only be a summation curve of variations of potential which occur during the cardiac cycle.

It may be added that where the electrodes are in a fixed position the electro-cardiogram may be altered by a change of the position of the heart relatively to the electrodes; this, for instance, occurs markedly in the third lead (left arm—left leg) in some people where the heart moves considerably with respiration.

As a result of the work of Sir Thomas Lewis and others this electro-cardiogram has been analysed with most illuminating results. To follow this analysis is difficult for those not well versed in electro-cardiography, but to-day all students who come to the bedside have a working knowledge of the "mechanism of the heart beat" due to the efforts of these investigators. Thus we know that the starting-point of the heart beat is at the sinus node or "the pace-maker," spreads over the auricle, reaches the auriculo-ventricular junction, and inaugurates there the changes which lead to ventricular contraction. This stimulus for ventricular contraction first traverses the bundle of His, the A-V bundle, which bundle divides into right and left branches to supply the respective ventricles. In dealing with the conduction of the impulse in this A-V bundle system it may be noted that Keith Lucas mentions the work of Mines and Rocke, which suggests that the whole system may be analogous to an enormous myoneural junction.[1] At any rate, the ventricular conducting system, as known to-day, consists of four distinct portions—namely:

A. The undivided A-V bundle.

B. The right and left branches of the bundle.

C. The enormous arborization formed by the division and redivision of these branches into an interlacing network of fibres lying beneath the endocardium all over the inner surface of each ventricle.

D. Extending from the arborization, filaments of this conducting tissue pass in amongst the branched fully striated true muscular fibres of the myocardium, to end in relation with the semi-striated Purkinje fibres.

It is necessary to visualize this conducting mechanism, and this may be helped by comparing it to the ignition system in a two-cylinder motor engine, but remembering that the cylinders (that is, right and left ventricular chambers) must be ignited simultaneously. We have two wires, one leading to each cylinder. These represent the A-V bundle branches. When we consider the cylinders, we have, not one point of ignition, but we have innumerable points all over the myocardium which represent, as it were, the sparking plugs. In order that these sparking plugs may be ignited simultaneously we have the tremendous arborization formed by branching of the A-V bundle. The advantages of this enormous anastomosis are obvious. It means that it would be extremely difficult to block the impulse once it has got past the larger branches of the bundle, and also that if there is a block in the anastomosis at any point it will need to be of very considerable magnitude to have any effect upon the igniting stimulus.

To follow up the analogy, and by means of it to interpret what Lewis and others have shown us experimentally, we have to form the conception that once an impulse reaches the arborization it will spread all over the myocardium in what we recognize as a relatively short period of time. We also have to realize that if the impulse arrives or starts in one cylinder or ventricle, it will spread almost simultaneously through the arborization into the other cylinder or ventricle. This allows us, therefore, to explain why the heart will contract, apparently normally, so far as all our clinical findings go, after there has been a lesion which completely destroys one of the branches of the A-V bundle. It was by accurate and scientific tracing of the spread of the electrical excitation over the living ventricle that these investigators have shown us how the stimulus spreads, and how an electro-cardiogram can be made to alter as the result of the injury of one or other branch of the A-V bundle. It seems to-day that the electro-cardiogram has placed us in such a position that we are able to localize a lesion which occurs in the ventricular conducting system of the heart.

The recognition of a complete heart-block—that is, a lesion in the undivided A-V bundle, where the auricular impulse fails to pass to the ventricle, and the ventricle beats at its idiopathic rate—is a simple matter when an electro-cardiogram is available. The certainty of the presence of a complete, incomplete, or partial heart-block is, of course, a very great factor in forming a prognosis.

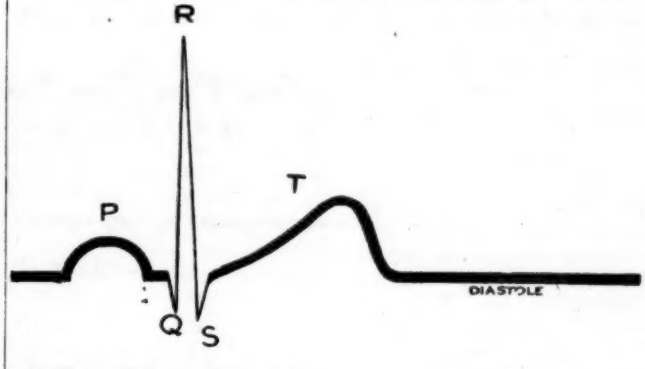

FIG. 1.—Diagram of normal electro-cardiogram.

Without going into a very detailed consideration of the electro-cardiogram, it may be sufficient to say that in the diagram above (Fig. 1) the Q.R.S. group of deflections are taken to represent the summation of the changes which follow the flow of the impulse along the right and left branches of the A-V bundle. How much of this electric change is due to the spread in an arborization of the branch we do not think can be taken to-day as settled. There is no doubt, however, that amongst those using the electro-cardiograph it has become recognized that certain changes in the electro-cardiogram indicate a lesion, either temporary or permanent, in the right branch of the bundle, and an opposite variation indicates a lesion in the left branch. Figs. 2 and 3 show the electro-cardiograms in such a lesion.

From a practical point of view in clinical medicine the importance of these electro-cardiographic records lies in the fact that, taken statistically, they indicate a very grave prognosis, and it must be borne in mind that there is no other means at present except the electro-cardiogram of diagnosing such a lesion.

Dr. Willius, of the Mayo Clinic, recently published a most important set of statistics bearing upon the value of the electro-cardiogram from a prognostic point of view.[2] Taking his figures in connexion with this physical sign of a bundle-branch lesion or arborization block lesion, he gives the following summary of 112 cases:

"The cardiac mortality attending aberration of the Q.R.S. complex in all derivations of the electro-cardiogram practically trebles that of the control series.

"Aberrant Q.R.S. complexes in all derivations—cardiac mortality 62.9 per cent. in 14.2 months.
"Control series—cardiac mortality, 21.3 per cent. in 13.7 months.
"In cases where T negativity was added to the aberrant Q.R.S. complex the death rate is increased up to 86.7 per cent. in 12.7 months."

At the Royal Victoria Hospital, Belfast, we followed up the history of fifteen patients treated in hospital who showed a bundle-branch lesion, and found all were dead within twelve months. Of course, it must be understood that this is only a statistical return, and that there are some cases of bundle-branch lesion in which the patient seems to go along wonderfully well. Take, for example, a patient of one of us, aged 70, who has had this lesion for at least five years, and who during that period has successfully weathered an acute attack of pneumonia.

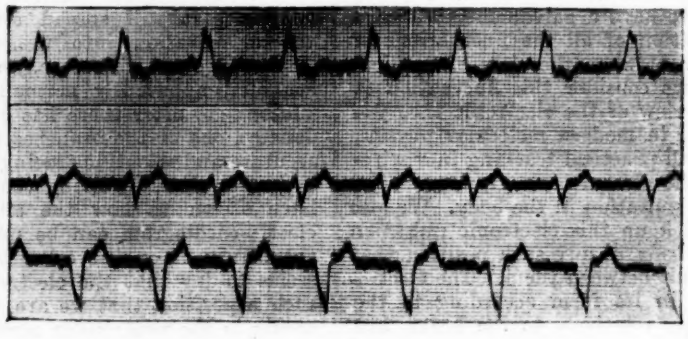

FIG. 2.—Lesion of the right branch of the A-V bundle.

INVERSION OF "T" WAVE.

To consider next the alterations which occur in the T wave of the electro-cardiogram is to enter upon the discussion of a physical sign the complete meaning of which we cannot as yet determine. On the other hand, it is a physical sign which we are able to recognize without difficulty; and again, from a statistical point of view, Dr. Willius has given us figures which, we think, are of most exceptional value. In the ordinary electro-cardiogram the T wave, which synchronizes with the systole of the ventricle, is upright in the first and second leads. It may be well to explain that in the first lead the heart lies in the circuit between the right and left hands; while in the second lead the heart lies in the circuit between the right hand and the left leg. As stated above, it is taken that the T wave is always upright in the normal individual in these leads, whereas in the third lead, between the left hand and the left leg, its direction may be below the horizontal line—that is, T negativity is present, or, we may say, the T wave is inverted (Fig. 4). Dr. Willius has divided his cases into four groups, and we have used this classification for a number of the patients we have been able to follow up at the Royal Victoria Hospital, Belfast. We give in detail, similar to that in Dr. Willius's papers, our results, which appear to be very comparable to his, if we remember that all our patients were in hospital in bed, seriously ill, whereas, no doubt, many of those of Dr. Willius were of the ambulatory type. We make this reference on account of our high death rate. We give also Dr. Willius's figures, including those he took from a control series of cases which did not show T negativity, carefully selected to be as clinically similar as possible to those which showed this electro-cardiographic change.

These figures show how remarkable in prognostic value is this T negativity or inversion of the T wave. Dr. Willius excludes the possible fallacy of the inversion being due to digitalis, so that his investigations confirm what has been always a very definite impression—namely, that the physical sign of a permanent inversion of the T wave in leads I and II is of grave prognostic significance.

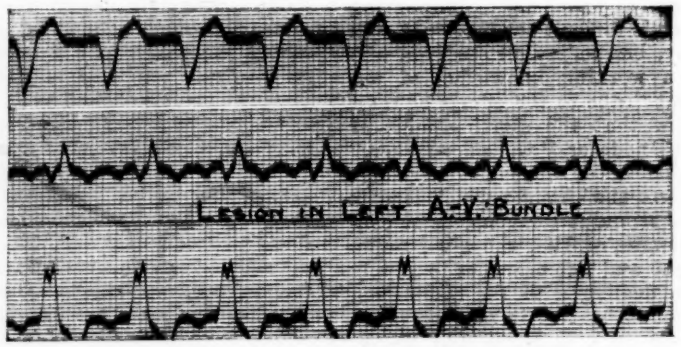

FIG. 3.—Lesion of the left branch of the A-V bundle.

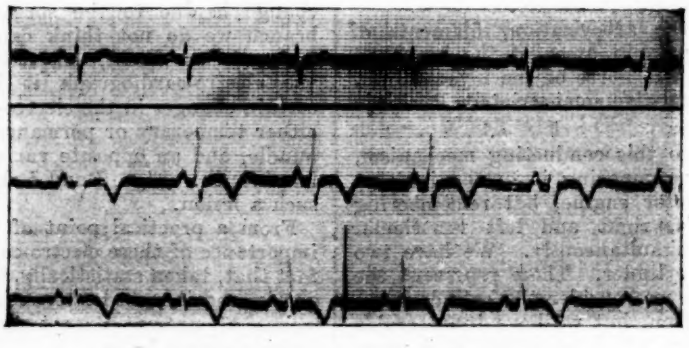

FIG. 4.—Inversion of the "T" wave in leads II and III.

SYNOPSIS OF ROYAL VICTORIA HOSPITAL CASES.

Inversion of "T" Wave in Lead I.

Twenty cases—males 16, females 4.

Clinical Diagnosis: Endocarditis with mitral regurgitation 5; mitral stenosis 4; aortic regurgitation 2; aortic and mitral regurgitation 1; myocarditis 1; arterio-sclerosis 2; syphilitic aortitis 3; angina pectoris 1; auricular fibrillation 1.

Of these cases 19 were traced: 2 (1 of syphilitic aortitis and 1 of mitral regurgitation) were still alive; the remaining 17 were dead, after periods varying from three years to one month. The average duration of life after the initial examination was 12.7 months. The mortality is 89.47 per cent.

Inversion of "T" Wave in Leads I and II.

Twenty-two cases—males 14, females 9.

Clinical Diagnosis: Endocarditis with mitral regurgitation 6; mitral stenosis 2; aortic regurgitation 2; aortic and mitral regurgitation 2; myocarditis 4; arterio-sclerosis 1; aortitis 1; hypertension 2; angina pectoris 1; auricular fibrillation 1.

Of these cases 19 were traced: 3 were still living—namely, 1 of aortitis, 1 of mitral regurgitation, and 1 of angina pectoris; the remaining 16 were dead, after periods varying from twenty-seven months to one month. The average duration of life after the initial examination was 9.7 months. The mortality is 84.2 per cent.

Inversion of "T" Wave in Leads I, II, and III.

Eleven cases—males 6, females 5.

Clinical Diagnosis: Endocarditis with mitral stenosis 1; aortic regurgitation 2; mitral and aortic regurgitation 1; myocarditis 3; auricular fibrillation 4.

Of these cases 9 were traced: 4 were still alive—namely, 1 case of mitral regurgitation, 1 of myocarditis, and 2 of auricular fibrillation; 5 were dead, after periods varying from five years to one year. The average duration of life after the first examination was 28.5 months. The mortality is 55.5 per cent. This group is, of course, very small in numbers for statistical purposes.

Inversion of "T" Wave in Leads II and III.

Twenty-two cases—males 7, females 15.

Clinical Diagnosis: Endocarditis—mitral regurgitation 1; mitral stenosis 9; aortic regurgitation 1; aortic and mitral regurgitation 1; myocarditis 2; syphilitic aortitis 1; angina pectoris 1; auricular fibrillation 5; pericarditis 1.

Of these cases 17 were traced: 7 were still alive—namely, 1 suffering from mitral stenosis; 1 from myocarditis, 1 from aortic regurgitation, 2 from auricular fibrillation, and 1 from pericarditis. 10 were dead, after periods varying from three years to one month. The average duration of life from the first examination was 10.1 months. The mortality is 58.5 per cent.

Final Summary of Dr. Willius's and Royal Victoria Hospital Figures.

Inversion of T Wave in Lead I alone:					
Dr. Willius	mortality 63.4%	in 8.5 months	...	115 cases.	
R.V.H.	,, 89%	in 12.7 ,,	...	19 ,,	
Control (Dr. Willius) ...	,, 26%	in 10.8 ,,	...	93 ,,	
Inversion of T Wave in Leads I and II:					
Dr. Willius	mortality 65.3%	in 12.7 months	...	49 cases.	
R.V.H.	,, 84%	in 9.7 ,,	...	19 ,,	
Control (Dr. Willius) ...	,, 17.5%	in 28 ,,	...	40 ,,	
Inversion of T Wave in Leads I, II, and III:					
Dr. Willius	mortality 62.5%	in 12.7 months	...	40 cases.	
R.V.H.	,, 55.5%	in 28 ,,	...	9 ,,	
Control (Dr. Willius) ...	,, 20.5%	in 18 ,,	...	39 ,,	
Inversion of T Wave in Leads II and III:					
Dr. Willius	mortality 50%	in 11.2 months	...	149 cases.	
R.V.H.	,, 58%	in 10 ,,	...	17 ,,	
Control (Dr. Willius) ...	,, 22.3%	in 19.2 ,,	...	110 ,,	

We wish to thank Dr. S. Picken for having accomplished the difficult task of following up the Royal Victoria Hospital patients. We cannot submit figures of a control series, but would mention that Dr. R. Marshall with one of us followed up about an equal number of Royal Victoria Hospital patients suffering from auricular fibrillation and found the mortality 68 per cent. in twelve months.

REFERENCES.
[1] Keith Lucas: *The Conduction of the Nervous Impulse.* [2] Electrocardiography and Prognosis, *Arch. Int. Med.*, October, 1922, pp. 434-450.

CONSERVATIVE GYNAECOLOGY.*

BY

ARTHUR E. GILES, M.D., B.Sc., F.R.C.S.

In discussing some of the lines along which operative gynaecology is proceeding it may be well at the outset to emphasize the fact that preservation of organs is of little use unless it goes hand in hand with preservation of function. Two examples will make my meaning clear. Thus, conservative treatment of pus tubes might be praiseworthy in a woman of 20, but it would be futile in a woman of 50. A myomectomy for uterine fibroids is a desirable operation in a young married woman, but it would be uncalled-for in the case of a woman, whether old or young, who had had a double ovariotomy performed on her.

The function that stands out most conspicuously as one to be preserved whenever it is possible is that of child-bearing. The next in importance is the ovarian function. We do not know fully the part that is played in the economy of the body by the ovary as an organ of internal secretion, but there is every reason to believe that it is a considerable part. Two other functions are to be regarded as of secondary, though still definite, value; they are the menstrual and the marital functions, and we may dispose of these first.

The marital function is, of course, primarily bound up with the purpose of child-bearing. But it may happen in the case of a married couple, still young, that the wife has to lose her uterus on account of fibroid tumours. Pregnancy is no longer to be looked for; but it may be very conducive to domestic happiness, or even essential to it, that married life should still be possible. If the vagina can be left unaltered, by doing a supravaginal hysterectomy, the object aimed at is more likely to be attained than it would be if a total hysterectomy were done, involving a shortening and narrowing of the vaginal vault. Conservative gynaecology would therefore choose the former operation, other things being equal. So also, in a case of total procidentia, requiring plastic operations on the vagina: in the case of a widow or a woman advanced in years, it does not matter how much the vagina is narrowed, and, for the purpose of the operative result, the narrower the better. But in the case of a woman who is called on to lead a married life, the operation must be sufficiently conservative to allow of this purpose being fulfilled.

In regard to menstruation, a man might suppose that any woman would be only too glad to be relieved of such an inconvenient phenomenon. But if he did, it would mean that he did not fully apprehend the feminine psychology. For while no doubt many women would gladly escape the inconvenience and pain of menstruation they would be conscious that they were not as other women. So it may be desirable by proceeding on conservative lines to preserve this function even when there is little or no hope or prospect of its leading to its natural corollary, pregnancy. For example, a woman of menstruating age may have a bilateral pyosalpinx, of a type necessitating the removal of both tubes. If an ovary can be preserved, or even a portion of one, menstruation will go on and the patient will be saved from the sense of mutilation; moreover, the internal secretion of the ovary will also, in some measure, be preserved.

For the rest of our subject it will be convenient to approach it from the operative standpoint, and to review in turn the conservative surgery of the ovaries, of the tubes, and of the uterus.

Conservative Surgery of the Ovaries.

The ovaries are the only organs that have a share in all the four functions under consideration. Their control of menstruation has just been referred to, and is quite definite: no ovaries, no menstruation. Their influence on sex instincts and sex feelings in married life is not so constant. Investigation of the after-results of double ovariotomy led me to the conclusion that if the ovaries are removed in girlhood, before the waking of sex, the sex feelings may remain undeveloped. But after a woman has arrived at her full maturity, the removal of the ovaries has not a constant effect. In some women desire and feeling disappear; in some they are diminished; in some they remain unaltered. But the last group is certainly in the minority; and so, if we wish to ensure as far as possible that a woman's sex feelings shall remain active, we must leave her at least some portion of ovarian tissue. That the ovaries are indispensable for the functions of child-bearing and internal secretion is obvious.

How then is surgery to adapt itself to these demands?

1. When the uterus has to be removed on account of benign conditions, such as fibroid tumours, fibrosis, or chronic metritis, healthy ovaries should always be left behind; a special effort should be made to retain at least one. In this case two functions have to go—pregnancy and menstruation; but two will remain—internal secretion and the marital function.

2. When the Fallopian tubes have to be removed, the ovaries may be so infected that they also have to go. But in many cases one ovary can be saved; this will mean the retention of the three functions of internal secretion, menstruation, and nubility. Pregnancy will not be possible, but at least its possibility will not have been destroyed by the operation, the disease itself having already settled the question.

3. There may be an ovarian tumour on one side, or a tubal pregnancy necessitating the removal of the ovary with the affected tube. The tube of the other side may be healthy, but the second ovary may be affected by cystic disease. Here it may be possible to resect the cystic part of the ovary leaving a small portion of healthy ovarian tissue. This will allow all the ovarian functions to be carried on, including pregnancy. I have records of several cases in which pregnancy occurred under these conditions.

4. Transplantation of the ovarian tissue can be included in our conservative procedure, though it is strictly reparative rather than conservative. The operation is still in the experimental stage, but cases have been recorded that have been successful not only from the operative point of view, but also in the matter of restoring the functions of menstruation and pregnancy.

Conservative Surgery of the Tubes.

The tubes are not essential for the performance of the menstrual and marital functions; and as far as we know they have no value in the matter of secretions. Their one function is to convey the spermatozoa up to the ovum, and the zygote or oösperm down to the uterus. By reason of occlusion at one or other end this function may be in abeyance, and the aim of conservative surgery is to restore communications. Obviously this is worth doing only under certain conditions: the patient must be of the child-bearing age and the uterus and one or both ovaries must be healthy. Three procedures are in vogue.

* An address delivered at the North-East London Post-Graduate College, Tottenham.

1. *Salpingostomy.*—As the result of a mild inflammation the tubal ostium may be sealed up, without evidence of other gross changes in the tube. An artificial ostium can be formed by making a longitudinal incision in the tube, as near to the ovary as possible, and oversewing the cut edges with fine silk to prevent reunion.

2. *Drainage of Pus Tubes.*—In cases of pyosalpinx the plan has been tried of laying the tube open from end to end and leaving it open to drain. This is done instead of removing the tubes. From the point of view of pregnancy, the chances can at least be no worse, as the result of drainage, than they were before; theoretically, they may be better. But it remains a question whether a tube that has been a pus sac for some time can ever regain its function. Personally I should not be at all sanguine about it; but only time can determine whether the experiment is sometimes worth trying. It may be found that the result as regards pregnancy is *nil*, and that the damaged tubes remain a source of danger and ill health. It would be necessary, when laying open tubes for drainage, to make sure that the uterine ostium of the tube was patent.

3. *Restoration of an Occluded Uterine Ostium.*—Where the tube is not too badly damaged but its uterine end is impervious, attempts have been made to restore this channel. The method adopted has been to pass a long straight needle, threaded with several strands of catgut, along the tube, through the isthmus, into the uterine cavity, and then across through the isthmus of the opposite side into the other tube. Another plan is to open the fundus of the uterus from the front and pass the strands of catgut from the uterine cavity into the tubes. The wound in the uterus is then closed. These ingenious methods are, of course, experimental; and here, again, time alone will show whether they have any practical value. If only one case of pregnancy followed the operation it would be worth while persevering with the attempts, since the alternative to operation is a hopelessly incurable sterility.

Conservative Surgery of the Uterus.

Perhaps the first warning that should be uttered in this connexion is against meddlesome surgery of the cervix. It is the fashion in some quarters to amputate the cervix for prolapse and procidentia. No doubt it happens occasionally that amputation is required for elongation of the vaginal portion of the cervix. In prolapse there is an appearance of elongation of this portion, and perhaps some operators have mistaken this for a true hypertrophy, and they have thus been led to do an amputation, with results that can only be regarded as very bad from a conservative point of view.

1. *Repair of a Torn Cervix.*—This is eminently a conservative and prophylactic measure. A deep bilateral tear of the cervix is unfavourable to conception, partly because it is nearly always associated with "erosion," and this in turn causes a muco-purulent discharge, which is noxious to spermatozoa. If pregnancy does occur it is very liable to end in a miscarriage. Repair of the torn cervix is favourable to pregnancy. It is also a sound prophylactic procedure, because such a cervix is in a highly favourable condition for the development of carcinoma.

2. *Uterine Fibroids: Preservation of the Uterus.*—There are many cases in which uterine fibroids can be treated by myomectomy instead of hysterectomy. Several factors must be considered when deciding between the two operations; but they may be summarized by saying that myomectomy should always be done when it is surgically possible in a woman of child-bearing age, provided that other conditions are favourable for child-bearing, and that the operation does not leave a battered and useless uterus. After the age of 40 to 45 myomectomy seldom has any practical value. Papers advocating the more frequent performance of myomectomy were read by Mr. Bonney and myself at the meeting of the Obstetrical and Gynaecological Section of the Royal Society of Medicine in October, 1922.

3. *Radium in Chronic Metritis.*—There are cases of chronic metritis that prove refractory to repeated curetting and to vaccine treatment, and it has been found necessary in the past to do a hysterectomy in order to overcome excessive losses or constant purulent discharge. In a woman under 40 one hesitates to resort to this extreme step, and an alternative plan is now offered by radium. A tube containing 110-115 mg. of radium is introduced into the uterus after a slight dilatation and left for twenty to twenty-four hours. Many good results have been reported. The treatment is not devoid of the risk of inducing permanent atrophy of the ovaries, in which case the functional results would be even worse than those following hysterectomy. But even where the ovaries have been affected it has sometimes been found that this result is transient, and menstruation has been renewed after some months, showing that the ovarian activity has been restored. A course of repeated applications of x rays seems to have a more damaging effect upon the ovaries than a single application of radium.

4. *Preservation of Cervix in Hysterectomy for Benign Conditions.*—A reference has already been made to this. There are, of course, cases where the condition of the cervix necessitates a total hysterectomy. But I am convinced that when the cervix can safely be left the subtotal hysterectomy is a better operation; and this partly for the reason that the vagina is left unaltered and so is better adapted for the continuation of married life.

THE AFTER-EFFECTS OF CERTAIN INDUSTRIAL INJURIES, AND THEIR TREATMENT BY X RAYS.*

BY

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CERTAIN forms of industrial injury often result in limitation of function owing to the formation of an excessive amount of fibrous tissue during the process of repair. Examples of such injuries are those involving the tendons of the wrist or fingers after either primary or secondary suture; extensive lacerated wounds or burns of muscle, and even the less serious condition of teno-synovitis. One has only to recall the usual course of treatment in such cases—namely, a prolonged period of after-treatment in the massage and electrical department—to realize that there is a serious economic factor involved, for during this period the patient is being paid compensation and too often the end-results are not at all satisfactory.

It is apparent, therefore, that any treatment which will shorten this period of convalescence and which may possibly improve the end-results deserves to be widely known and extensively practised. The object of this paper is to urge the claims of radiotherapy in such cases. I venture to assert that the final results of suitable x-ray treatment are better and more quickly obtained than by the older and more usual methods of massage, movement, and negative electrolysis, all of which I have practised and have definitely discarded.

Whilst fibrous tissue is necessary for the restoration of function, the formation of such tissue in excess of actual requirements leads to that limitation of function which is so often a marked feature of these cases. The difficulty would be solved if we could change this scar tissue into a supple vascular tissue which would not interfere with function. This, I believe, is what is done by radiotherapy. I find that it is by no means uncommon for these cases to be discharged within a period of two or three weeks from commencing treatment. The treatment is carried out on three days a week only—in other words, an average of nine attendances of thirty minutes each is the only tax on the man's time. The more recent the injury the more easily will the final result be obtained. But the term "recent" is purely relative. It would be more accurate to say that the less fully organized, the more vascular the tissue, the more satisfactory the results. One case has been selected for a detailed report as it is a typical example of limited function resulting from just such an accident—namely, limitation of movement following on tendon suture and persisting in spite of two months' treatment by massage and movement. It was finally converted into an almost perfect functional result by eight treatments in the x-ray department spread over a period of two and a half weeks.

The patient had an extensive cut of the second finger of the left hand extending round the front and side of the proximal interphalangeal joint and severing the flexor tendons. The tendons were sutured and the patient was submitted to after-treatment in the massage department for two months. At the end of this time the condition was as shown in Fig. 1, the movement being limited and the finger thickened and painful.

*A paper read before the Yorkshire Branch of the British Medical Association, June 1st, 1923.

At the end of the *x*-ray treatment there was no perceptible thickening, movement was free from pain, and there was a complete range of passive movement although active movement was a few degrees short of full. (See Fig. 2.)

Although this is a recent example it is by no means unique. During 1921 I was engaged in the investigation of the effects produced by the action of *x* rays on various conditions in which the effects of fibrous tissue formation were responsible for certain symptoms which failed to react to other physiotherapeutic remedies.* However grouped there was one outstanding feature in all the cases in this series—namely, the marked softening of excessive fibrous tissue by a comparatively short treatment with hard filtered *x* rays. Clinical improvement was shown by such evidence as (1) the relief of pain when a nerve was being strangled by cicatricial tissue in cases of superficial scars and in certain cases of neuromata in amputation stumps; (2) by greater and more rapidly secured freedom of movement in such a joint as the shoulder after prolonged suppuration and extensive operations in its neighbourhood; (3) by a greater range of action in cases of transplanted tendons for injuries of the musculo-spiral nerve; (4) by improvement in peripheral circulation where the brachial vessels were being constricted by scar tissue following gunshot wounds. Even in some cases of Dupuytren's contraction of long standing there was considerable softening of some of the lateral bands although the central

FIG. 1.—Before treatment.

FIG. 2.—After treatment.

palmar mass held out and so no clinical improvement resulted.

Although the majority of these observations were made on cases of war injury, a sufficient number of cases have been treated in civilian practice to prove that the same treatment is applicable. The action of radiotherapy which is now under consideration has been observed by others beside myself, but it does not appear to be at all widely known.

In post-operative radiotherapy of cases of amputation of the breast the softening effect on the scar tissue left after extensive dissection is so striking that its use for this purpose alone—apart, that is, from any prophylactic effect—would almost be justified.

As another example we may take the action of radiotherapy on keloidal tissue; it was in fact this action that first suggested to me the investigation on fibrous tissue generally. On consulting such references as came readily to hand I discovered that radium treatment on scar tissue had been carried out by Dr. W. Stevenson of Dublin, and that the results had been published by him in two subsequent papers.[1] It is hardly necessary to point out that the only essential difference between radium therapy and *x*-ray therapy is in the wave-lengths employed in each case. Since radium is not so generally available as *x*-ray apparatus this reference to Stevenson's work confirmed me in my resolution to use intensive *x*-ray treatment. The formula resolved upon has not since been changed. It is 4 to 5 ma. through a 3 or 4 mm. aluminium filter; Coolidge tube; spark-gap of 8 inches; 12 inches distance; time 12 minutes. Any attempt to cut down the dosage has led to disappointing results. No injurious results have ever been noticed.

It was not until a few months ago that I accidentally discovered a short note by Dr. A. W. Williams on this same subject.[2] It appears that the attention of Dr. Williams was also drawn to this matter by the action of *x* rays on keloidal tissue. The war injuries treated by him were more superficial, and his technique differed accordingly from that adopted by myself, but his published results were just as successful. Laquerrière (France) has reported two cases in which intensive radiotherapy, undertaken primarily for the treatment of uterine fibroids, resulted not only in a cure of this condition but also in marked freeing of intra-abdominal adhesions, as shown by increased mobility of the uterus.[3] I do not, therefore, claim any originality in applying these methods of treatment, but the experience of others here mentioned emphasizes the fact that we have at our disposal a treatment which seems to have great advantages over other methods.

So far I have been dealing with conditions which are similar inasmuch as we can group them as traumatic in origin. I should like to close by pointing out that other morbid conditions end in a fibrosis which is not always beneficial to the patient. Our nomenclature of diseases is too often purely topographical. Attention is distracted from the fact that such apparently disconnected affections as chronic arthritis, lumbago, pleurodynia, sciatica, and brachial neuritis, at any rate as regards their later stages, are in reality often the manifestations of that inflammation of the connective tissue known as "fibrositis." It matters little for our present purpose what the precise etiology of such cases may be provided that we realize that under the heading of "fibrositis" we are including all those cases in which the morbid process is essentially the inflammation of the white connective tissue, be the situation muscular, aponeurotic, synovial, or perineuritic. Whilst medicinal treatment or a masterly inactivity may effect a physical cure, functional restoration can only be obtained by local treatment. The numerous cases of relief of pain by treatment by *x* rays in certain forms of sciatica and neuralgia may be explained by the softening action on various adhesive bands.

I believe that there is scope for radiotherapy in certain other diseases. I would quote especially two cases which have been treated, apparently successfully, by this method of treatment. The first was an instance of chronic mastitis in a male patient aged 17; the symptoms were greatly relieved after four treatments, although the condition had resisted other measures for nine months. The second case was one of obstinate empyema which had lasted for two years and had resisted all methods of treatment, including operation. Further surgical measures being considered inadvisable on account of the patient's general condition, radiotherapy was begun. The cavity was injected with bismuth emulsion, and that side of the thorax was treated twice weekly for a period of three or four weeks. Was it merely a coincidence that the condition began to improve and within a few weeks was healed and has remained so down to the present time? Is it not just as reasonable to suggest that collapse of the suppurating cavity has been helped by softening on the one hand the surrounding chronic fibrous tissue, and on the other the constricting bands which caused the double sausage pattern shown in the *x*-ray film of this case? I may be wrong in this contention, but I would urge the trial of this method in a very similar condition, mechanically—namely, chronic bronchiectasis. Through the kindness of one of my colleagues a trial is about to be made of this method and the results, if any, shall be brought to notice on some future occasion.

*These results were published in the *Archives of Radiology and Electrotherapy* for August, 1921.

REFERENCES.

[1] BRITISH MEDICAL JOURNAL, July 4th, 1914, and *Lancet*, March 23rd, 1918. [2] BRITISH MEDICAL JOURNAL, December 2nd, 1916. [3] *Journal de Radiologie et d'Electrologie*, May, 1921.

Memoranda:
MEDICAL, SURGICAL, OBSTETRICAL.

THE TREATMENT OF SPRUE.

THE clinical resemblance between coeliac disease and sprue has been noted by several observers. Dr. Spence, who was at the time working on the former disease at the Hospital for Sick Children, Great Ormond Street, was good enough to see a case of sprue with me, and suggested that the comparatively fat-free diet used in cases of coeliac disease might be tried. The results of this treatment have proved satisfactory.

DIET.

5 a.m.—Cup of weak tea, 1 round of dry toast.
8 a.m.—1 oz. casein, 1 pint machine-skimmed milk, and 1/2 pint of tea (without sugar), 4 rounds of dry toast, and 1 oz. cheese.
11 a.m.—1/2 pint machine-skimmed milk, 1/2 oz. casein.
11.30 a.m.—Juice of one orange.
12 noon.—1 pint liver soup, 2 oz. minced chicken, 2 rounds dry toast, 4 oz. junket, 4 oz. calves' foot jelly. (*Note.*—The junket is made with skimmed milk. Liver soup is made by simmering 1 lb. of fresh liver with two pints of water for two hours, and then grating the liver into the liquid.)
4 p.m.—1 oz. casein, 1 pint skimmed milk (machine), 1/2 pint of weak tea (without sugar), 1 oz. cheese, 2 cream crackers.
8 p.m.—1 pint machine-skimmed milk, 1 oz. casein, 4 oz. junket, 4 oz. calves' foot jelly.
10 p.m.—Juice of one orange.

The notes of the cases are as follows:

Case 1.—A. B., when admitted on December 4th, 1922, was seriously ill with sprue. Diarrhoea had begun in October, 1919. This had continued with intervals of slight improvement till June, 1922, when he had to give up work and remain at home on account of weakness and diarrhoea. He was extremely emaciated, weighing only 7 st. 3 lb. He was anaemic, the tongue was red, raw, and there were numerous superficial ulcers on it, and on the buccal mucous membrane. The abdomen was distended and tympanitic, and the liver dullness was considerably diminished. The stools, of which he was passing three or four daily, mainly in the early morning, were bulky, frothy, foul, and pale in colour, and contained 43.7 per cent. of fat. Attacks of tetany were frequent, and prevented him from sleeping. On the diet he improved rapidly; the tetany disappeared within two weeks, and in three weeks the motions had become solid, light brown in colour, and one or two in twenty-four hours. In the first week he gained 2½ lb., in the second week 2½ lb., and then an average of about 6 lb. a week till on April 23rd, 1922, he weighed 12 st. 2 lb. His general condition is now excellent.

Case 2.—C. D., admitted on February 1st, 1923, had suffered from morning diarrhoea since August, 1920. His condition was similar to that of A. B., except that there was no tetany. The tongue was red, raw, and with several painful ulcers. The stools were typical of sprue. His weight was 8 st. 12 lb. When put on the diet he improved rapidly, and at the end of eight weeks weighed 12 st. 7 lb.

Case 3.—E. F., invalided out of the navy with sprue on December 31st, 1919, had had all sorts of treatment in various hospitals. When admitted he had ulcers on the tongue and buccal mucous membrane, tympanitic abdomen, diminished liver dullness, and large, pale, foul, frothy stools. On the diet he rapidly improved, put on 14 lb. in weight, and now writes that he is looking and feeling exceedingly well.

I am indebted to the Director-General of Medical Services, Ministry of Pensions, for permission to publish this note, and to Drs. J. G. Willmore and A. G. Wilkinson for the care they took in supervising the treatment.

T. H. JAMIESON, M.D., M.R.C.P.Edin.,
Visiting Physician, Ministry of Pensions Hospital, Orpington.

HYPERSENSITIVENESS TO QUININE.

THE following case seems worth recording on account of the extreme severity of the symptoms occasioned by so small a dose as three-eighths of a grain of quinine, and of the divergence of those symptoms from those usually described as resulting from cinchonism.

Mrs. C., a spare woman of neurotic type, aged 50 years, married, two children, came under my care in June last, for the first time, suffering from a mild attack of influenza. Her past history presented no feature of clinical importance with the exception, as I subsequently learned, of her intolerance of quinine. This was discovered sixteen years ago, but the symptoms then were slight and the account now obtainable too vague to be of any value. Twelve years ago she was given a tonic containing iron and quinine citrate, and after taking a few doses she became very ill, with vomiting, diarrhoea, and erythema of the lower extremities, which was followed by desquamation. Three years ago she was given a mixture containing ammonia and 20 minim doses of compound tincture of cinchona. A few doses again produced gastro-intestinal disturbances, and intense erythema of the lower extremities extending as high up as the iliac crests. In from twenty-four to forty-eight hours the skin in this region presented a mottled purple appearance such as that of extensive ecchymosis, and later underwent dry desquamation. There was also a slighter and more patchy affection of the arms.

Unaware of these details, during her convalescence in June I prescribed for the patient iron and quinine citrate in 5-grain doses. She thought she recognized the mixture as similar in appearance to that which caused the trouble before, and therefore took only half a dose, which represents three-eighths of a grain of quinine. This was followed almost immediately by faintness and giddiness. She took brandy and went to bed. Within an hour she began to complain of a burning sensation in the upper abdomen accompanied by vomiting and diarrhoea which lasted for twenty-four hours. There was severe irritation of the lower extremities, the itching of which she described as intolerable. Within a few hours the legs became deep red up as high as the iliac crests, at which level the erythema definitely ceased. The hands and forearms were affected somewhat later and in a lesser degree. After twenty-four hours the erythema gave place to vesiculation; the entire surface of the thighs and buttocks presented, in fact, the appearance of a burn of the second degree. The legs, feet, and affected parts of the upper extremities did not vesiculate, but after a few days underwent desquamation. The temperature varied between 99° and 101° F. For treatment, calcium lactate was given by mouth and the skin lesion was treated as if it were a burn. The condition cleared up in about fourteen days.

It is noteworthy that with each attack the susceptibility to the drug has increased and lasted in spite of one interval of nine years; also that there has been on each occasion the same definite demarcation between the affected and the healthy skin areas.

Rye, Sussex. FRANCES E. BELL, M.B., B.Ch.

A "PRIVY" BIRTH.

THE following notes of a "privy" birth seem to be of value, especially from a medico-legal point of view.

About 3.15 a.m. on May 13th last I was called up to visit a woman who lived about two miles out in the country. I arrived at 3.45, and was met at the door by a neighbour of the woman, who was in a state of great trepidation. She stated that "something had happened" in the closet, but that she was too frightened to go and see what had happened. Finding that the woman was then in bed and apparently fairly well I went at once to the closet, about fifty yards away. This turned out to be a small open privy of a most primitive type, with two side walls, a back wall, a galvanized sheet of iron for roof, but with no door. On looking into the privy I saw the face of a child about half a yard below the level of the seat, the rest of the body being embedded in the contents of the pit. The child made a feeble inspiratory effort. I lifted the body out with cord and placenta attached, and carried it into the house. When nearing the house I noticed another slight inspiratory effort. The child was mature, pulseless as far as I could ascertain, stone cold, and with the appearance of a cadaver. The birth had taken place a full two hours before my visit. The ground around was covered with a hoar frost at the time. After a hurried removal of some of the filth the child was wrapped in warm flannel and artificial respiration started. I had two women assistants; one I instructed to massage the feet, the other to apply friction to the vertex. After about fifteen minutes of this four or five regular spontaneous respiratory movements were made, followed by an interval before they were again resumed. This continued for a considerable time, and it was not until an hour had passed that they became definitely continuous. The child was then put into a warm bath; the body was still cold when taken out of this, but breathing was regular and the child did well, and is well at the present date.

When doing artificial respiration I made gentle pressure and release movements over the epigastrium, which I had found effectual in other cases of resuscitation of the newborn. It was noticeable that, if the woman who was applying friction to the vertex stopped doing so during the time that regular respiration was being established, an arrest of the respiratory movements at once occurred. This seemed to give a valuable reflex stimulus.

The following points seem notable: (1) the child was in the privy for two hours; (2) the privy was an open one and the outside temperature below freezing point; (3) the cord and placenta were attached; (4) the child was dying when I arrived, was pulseless and stone cold; (5) resuscitation occupied one hour.

Llansantffraid, Montgomery. W. H. LEWIS, M.B., B.Sc.

Reviews.

MAN, MAGIC, MYSTICISM, AND MORALS.

IN his *Primitive Mentality*[1] Professor LÉVY-BRUHL of the Sorbonne takes as a working hypothesis his previous work set out in *Les Fonctions Mentales dans les Sociétés Inférieures*, published in 1910. As the translator, Miss CLARE, states in the preface to the English version, the earlier book laid special stress upon the law of participation, considered in relation to the principle of identity, and also upon the fact that the primitive has little perception of the law of contradiction. In his new book Professor Lévy-Bruhl aims at showing what causation means to primitives and the inferences to be derived from their idea of it.

In his introductory remarks the author argues that the primitive's distaste for the discursive operations of thought, the restriction of his ideas to a small number of objects, and his lack of reflection, are not due to inherent incapacity or natural inaptitude; to understand the problem properly, we must recognize that the primitive makes no distinction between this world and the other, between what is actually present to sense and what is beyond. He actually dwells with invisible spirits and intangible forces, and to him it is these that are the real and actual. Professor Lévy-Bruhl asks us to abandon the belief that primitive minds are orientated like our own and react as ours do to the impressions made upon them; for, when we find they fail so to do we are apt to explain this failure by such hypotheses as the feebleness and torpidity of their minds, stupidity, perplexity, child-like ignorance, etc. This merely leads to defining beforehand the mental activity of primitives as a rudimentary form of our own, and consequently to considering it as puerile and almost pathological.

The primitive's indifference to secondary causes; his fear of mystic and invisible forces, dreams and omens; his practices of divination; his firm faith in the test of ordeal; the mystic meanings he puts into accident, misfortune, and the causes of success; the equally mystic meaning of the white man's appearance and of the things he brings with him; his dislike of the unknown and his reluctance to abandon old customs in favour of new through fear of giving offence to ancestors and spirits by too ready acceptance of change, with his consequent attitude to European remedies—are all dealt with in a highly attractive manner throughout the fourteen chapters of a most erudite book.

In interesting chapters discussing the subject of omens the author deals, amongst many other things, with the primitive's fear of facts or events which are unusual, or of individuals who are more or less teratological, like the *monstra* and *portenta* of the Romans. When an omen of this kind appears the universal plan is to cancel it as quickly as possible: to guard against that which the monster portends it must be made to vanish. Abnormal presentations are dealt with by the primitives as a dangerous portent—for example, in footling births the child is slain, while if a goat is giving birth to a kid and the head appears first the animal is slaughtered. Where a woman, in labour for the first time, gives birth to twins "an old woman of the village (amongst the Kikuyu of East Africa), generally the midwife, stuffs grass into their mouths until they are suffocated, and then throws them out into the bush. If a cow or a goat bears twins the first time, the same practice is observed." In British East Africa, if a child is born feet foremost it is smothered. The reasons given are that if the infant is permitted to live their crops will all wither up from drought, their cattle will die, and many other evils befall them. Especial fear is shown of children who cut their upper teeth first, as they prevent the rain from falling. To counteract this, such children are buried alive in wet ground. It is interesting to note the survival of a feeling of "uncanniness" about such an event in Scotland, although there the belief is attenuated and the risk falls on the child itself:

> "They that cut their teeth abune,
> Will never wear their marriage shoon."

In the Belgian Congo these children are the children of woe, and are either thrown into water or exposed to wild beasts. If mother-love saves the unfortunate infant, it is later sold into slavery, for, if living in the village, it causes all the misfortunes that occur there, and the father and mother are continually twitted with the fact of having brought such a being into the world, and held up to universal derision. The abnormal child is on the same level as the possessor of an evil eye, and to the native mind there is no cruelty in the slaying of it; it is merely a measure undertaken for the public safety; the social group must no longer be kept in contact with it. Throughout its pages *Primitive Mentality* is a book full of interest and should find its place on the shelves of those interested in the lore of the human family.

[1] *Primitive Mentality*. By Lucien Lévy-Bruhl, Professor at the Sorbonne. Authorized translation by Lilian A. Clare. London: George Allen and Unwin, Ltd. 1923. (Demy 8vo, pp. 458. 16s. net.)

DISSEMINATED SCLEROSIS.

THE American Association for Research in Nervous and Mental Diseases has published a report of the papers and discussions at its meeting at New York on December 27th and 28th, 1921, on the subject of *Multiple Sclerosis*,[2] which is on the same general lines as the report issued in 1921 on acute epidemic encephalitis (lethargic encephalitis). In the present volume there are four sections, dealing with general and historical considerations, general and special symptomatology, the differential diagnosis, course, and treatment, and the pathology of disseminated sclerosis, to which twenty-six medical men have contributed. Dr. W. Timme's historical retrospect is illustrated by the frontispiece showing Sir Robert Carswell's drawing of the spinal cord, which appeared in his work on *Pathological Anatomy* (1838). In America the distribution of the disease resembles that of simple goitre in being high in the region of the great lakes, and Dr. C. B. Davenport, who deals with its geographical and racial incidence, suggests that the Scandinavian race is specially subject to it, and that the hereditary factor, whatever may be found to be the exciting cause, may play a part in its development. The commission does not share the view that the disease is so infrequent in America as some authorities have stated. A plea is put forward by Dr. C. L. Dana for the prolonged application to the etiological problems of this disease of the methods of ecology, or the science of the relation of a living organism to its environment, which was originally linked up with botany but is now applied to animal life.

According to Dr. B. Sachs, the differential diagnosis from hysteria has not been a matter of difficulty and does not often arise. Reference is made to Klingmann's detection by means of very small test objects of as many as sixteen minute multiple absolute scotomas in or near the point of fixation and rather more numerous in the temporal than in the nasal portion of the field of vision, in patients in whom other examiners might have only noted a large diffuse relative scotoma. The commission did not find any evidence of implication of the sympathetic system or of the endocrine glands, and ascribes this immunity to the automatic action the segmental mechanism of the spinal cord is able to assume in relation to the visceral functions when cut off from higher influences. The difficult question whether the morbid process is primarily degenerative or acutely inflammatory is left open; if the acute cases cannot be removed to some other category, such as encephalitis, two forms of the disease would have to be recognized—one with an acute inflammatory commencement and later changes of a purely degenerative nature, the other which never presents any evidence of inflammation, and the process is degenerative from start to finish. Search for a causal spirochaete or other organism gave negative results, and the Wassermann reaction of the cerebro-spinal fluid was uniformly negative, but a paretic type of colloidal

[2] *Multiple Sclerosis* [*Disseminated Sclerosis*]. Association for Research in Nervous and Mental Diseases—A Series of Investigations and Reports. Vol. ii (1921). New York: Paul P. Hoeber. 1923. (Med. 8vo, pp. xvi+241; 1 plate, 22 figures. 3.75 dollars.)

gold curve was obtained in 50 per cent., and the luetic type of curve in about 16 per cent. of the cases. Arsenical treatment is stated to be the most successful method, and the use of neo-salvarsan and mercury is mentioned, but without any enthusiasm. There is a copious bibliography, which adds to the value of this book as a useful source of reference.

TWO FRENCH TEXTBOOKS OF PSYCHIATRY.

THE sixth edition of Dr. J. ROGUES DE FURSAC'S well known *Manuel de Psychiatrie*[3] contains much new material. He points out that the last few years have furnished mental pathology with a number of facts of considerable practical and theoretical interest. Amongst these he refers to the harvest of clinical data which has resulted from the discovery of lethargic encephalitis. Actually, the account he gives of this disorder is scarcely adequate in view of its importance to psychiatry, and only eight lines are devoted to encephalitis in children. Recent developments in the treatment of general paralysis are discussed at length. The author regards the results of antisyphilitic treatment as distinctly encouraging, and his own experience has led him to the view that the most severe symptoms can be alleviated by active therapy. He regards Von Wager's methods of treatment also as promising, and has personally observed remarkable improvement in general paralysis after infective fevers. The section dealing with constitutional psychopathic states (hypermotivity, psychasthenia, obsessions, hypochondriasis, etc.) has been considerably augmented, and includes, rather unfortunately we feel, under the same category the congenital group, idiots, and imbeciles. On the whole, the French school of psychiatry would appear to stress unduly the constitutional factor in the various forms of inadequacy. There must be very few people, indeed, who are not subject to episodes of anxiety, feelings of inferiority, mild obsessions, and so on, as a result of other than constitutional factors. The ability to cure and overcome such psychoneurotic symptoms probably depends largely on the degree of constitutional weakness, a fact which was revealed in a striking manner in the war psychoneuroses. Dr. de Fursac is specially interested in the problems of medico-legal psychiatry, and a section is devoted to this subject. The book is comprehensive, and the additional material has brought it thoroughly up to date. We have no doubt it will continue to maintain its position as one of the leading French textbooks of psychiatry.

Psychiatrie du Médecin Praticien[4] is one of a series of volumes intended for the use of the general practitioner rather than the specialist. The initial difficulty experienced by the practitioner in dealing with mental cases is to place them into categories which carry with them some notions as to causation, development, and prognosis. Diagnosis is much more difficult in the psychoses than in physical diseases, where the symptoms can usually be referred to some special organ or system. Recognizing this, the authors of the book before us, Drs. M. DIDE and P. GUIRAUD, have sought to furnish clear clinical descriptions of the various forms of mental disorder in order that the practitioner may be in a position to recognize the category to which a case belongs. A number of excellent plates depicting the main clinical types are included in the volume, and serve to illustrate and vitalize the written descriptions. The opening chapter deals with the subject of unconscious mentation, but in the sections which follow the authors confine themselves to a descriptive rather than an interpretative account of their cases, and they do not appear to have been influenced to any notable extent by Freudian theories. The book is excellently printed and the arrangement of headings and paragraphs renders it clear and readable. The French practitioner should find the volume useful and suited to his needs. It will also give the English psychiatrist a good general outline of French psychiatry, though it cannot be said to include any new facts or theories of interest to the specialist.

[3] *Manuel de Psychiatrie.* By J. Rogues de Fursac. Sixth edition revised and augmented. Paris: Félix Alcan. 1923. (Cr. 8vo, pp. xvi + 906; 4 plates. Fr. 30.)

[4] *Psychiatrie du Médecin Praticien.* By M. Dide and P. Guiraud. Paris: Masson et Cie. 1922. (Cr. 8vo, pp. 415; 8 plates. Fr. 20 net.)

PEDIATRICS.

WE are not surprised to learn from the preface to the second edition of Dr. H. C. CAMERON'S excellent little book on *The Nervous Child*[5] that some have found fault with the title, maintaining that the book should have been called, not "The Nervous Child," but "The Normal Child," presumably on the ground that the manifestations with which the author deals are found in all normal children. Perhaps such a title as "The Mental Hygiene of Childhood" would have been best, though it might not have been so attractive as that actually chosen. The keynote of the book is to be found in the concluding lines—"The hygiene of the child's mind is as important as the hygiene of his body; both are studies proper for the doctor." The present edition contains a new chapter on management and conduct, in which the author, while acknowledging the value of Freud's contribution to psychology, deprecates the indiscriminate application of his teaching to abnormal conduct in children, and by several striking examples shows how these faults may be due to mismanagement by parents or nurses. Timidity, anxiety, and fears are particularly apt to develop in the children of very devoted parents, especially in the only child, on whom all the care is concentrated. Again, bad temper, disobedience, and negativism are most likely to arise as the result of an unrestful atmosphere in the home in response to attempts at control which are at once ineffectual and persistent. We can cordially recommend this work to the family practitioner and to all interested in the management of children.

The ninth edition of Dr. LOUIS FISCHER'S textbook on *Diseases of Infancy and Childhood*,[6] the first edition of which was published in 1907, differs from the previous issues in that it is divided into two volumes. The first volume is in six parts, devoted respectively to infant feeding, the development and hygiene of the infant, diseases of the newborn, alimentary diseases, diseases of the heart, liver, spleen, pancreas, peritoneum, and genito-urinary tract, and diseases of the respiratory system. The second volume also consists of six parts, which deal with infectious diseases, diseases of the blood and ductless glands, nervous diseases, diseases of the ear, eye, skin, and abnormal growths, diseases of the spine and joints, and miscellaneous subjects, including developmental exercises, anaesthesia, disinfection, and administration of drugs. Numerous changes have been made in the text and additions to the illustrations, which, as we pointed out in our notice of a previous edition (BRITISH MEDICAL JOURNAL, March 22nd, 1913, p. 617), are of great value. Special attention has been given to the home modification of milk; the chapter on vitamins has been rewritten, and those on the diagnostic and therapeutic value of x rays and the diagnostic importance of lumbar puncture revised. A chapter on transfusion has been added. The work, which is provided with an index in each volume, will prove a useful addition to the practitioner's library.

PRACTICAL PHYSIOLOGY.

Practical Physiology,[7] by ANREP and HARRIS, is a laboratory manual, not intended for self-tuition, but for use under the guidance of qualified teachers. In planning the book no account has been taken of examination requirements; some of the exercises given could be set as a practical examination, while others, much more important, would be inappropriate. It embraces the work suitable for junior and senior medical students and advanced students of physiology.

In making their selection of laboratory experiments the authors have aimed at striking a balance between the

[5] *The Nervous Child.* By Hector Charles Cameron, M.A., M.D., F.R.C.P. Second edition. London: Henry Frowde, and Hodder and Stoughton. Oxford Medical Publications. (Cr. 8vo, pp. vii+224. 7s. 6d. net.)

[6] *Diseases of Infancy and Childhood: Their Dietetic, Hygienic, and Medical Treatment: A Textbook Designed for Practitioners and Students of Medicine.* By Louis Fischer, M.D. Ninth revised edition; 2 volumes. Philadelphia: F. A. Davis Company. 1922. (Med. 8vo. Vol. I, pp. xxvii+603; 146 figures, 37 plates. Vol. II, pp. ix+605; 247 figures, 43 plates. 12 dollars the 2 volumes.)

[7] *Practical Physiology.* By G. V. Anrep, M.D., D.Sc., and D. T. Harris, M.B., B.Sc., B.Sc. Introduction by Professor E. H. Starling, C.M.G., M.D., F.R.C.P., F.R.S. London: J. and A. Churchill. 1923. (Roy. 8vo, pp. x+212; 197 figures. 10s. 6d. net.)

science of physiology and its clinical applications, and at giving the medical student a sound practical basis for his clinical work when he passes into the hospital. Thus, under the heading of gastric secretion, the production of a gastric fistula and the method of obtaining pure gastric juice are considered; also the formation of the stomach pouch for the study of the nervous mechanism of gastric secretion and the chemical action of food substances. Following on this are directions for the collection of gastric juice in man and the analysis of the test meal, the student learning how to determine the total acidity, the free hydrochloric acid, the combined acid, the pepsin and rennin, and the hydrogen ion concentration, and to apply the test for lactic acid. Again, under the heading of the visual sense, in addition to matter of theoretical interest, are studied such practical subjects as the use of the perimeter and the mapping of the field of vision, the pupillary reflexes, the determination of the dioptric strength of a lens, the determination of the power of accommodation, and the use of the ophthalmoscope and retinoscopy. Similarly, with all the great organic systems, the lessons are so arranged as to afford both theoretical insight and practical aptitude, and the student who takes the trouble to master them will find, when he commences his purely medical studies, that his power of assimilating medical facts is vastly facilitated.

It is probable that in the teaching of pathology there is too great a tendency to regard each disease as an entity, having its own particular cause and lesions, characteristic course, and characteristic symptoms indicating its presence. That point of view is, doubtless, correct, but it is equally important that the habit should be acquired of regarding disease as a deviation from the physiological norm, and the practical course laid down by the authors will enable the student who follows it to approach the study of disease from that standpoint. Professor Starling, in his introduction to the book, states that "the time allotted to physiology is too short. It seems ridiculous that at the present time students should be expected to learn the whole of anatomy, physiology, and pharmacology in five terms, whereas thirty years ago they devoted two years to the same subjects, when we consider that, in the meantime, the content of physiology, as well as the importance of its practical study for clinical medicine, have increased three or four times. The effect of shortening the curriculum has been to send the student into the wards tired and confused, and to rob him of that freshness of outlook and keenness of interest which are essential if he is to make the most of his clinical studies."

HEALTH AND THE HUMAN SPIRIT.

THE quality of Mr. KEITH MONSARRAT'S little book *Health and the Human Spirit*[8] may be measured by a quotation from its closing pages: "What is truth? The question is no longer unanswerable. We need only to turn and look at the continuity of progress of which we are a part, all that wonder of activity which is going on around us and in us." From which it appears that the author is an optimist. But he is even more hopeful than this quotation implies, for while admitting that answers will not come easily, he yet thinks that "we may even find an answer to the question as to what the future holds for man's vitality when it can no longer use the body as a means of expression." Putting aside religious considerations, we may perhaps prefer to think of mankind as a collection of personalities rather than vitalities. We cannot think that vitality is a word happily chosen to connote the human spirit; it does not, for one thing, differentiate a man from a black-beetle.

For Mr. Monsarrat the health and salvation of the human spirit depend upon the acquisition of a knowledge of reality. "The time will come," he says, "when all the voluntary activities of man will find guidance from a knowledge of the process of life," and again, "it is becoming clear that the new faith will rise out of interpretation by consciousness of things human and things natural, of fact and reality, and will call to devotion not to some superhuman idol, but to the expansion of human life and the perfecting of its home, the earth." Belief, he says, "is a decision to ascribe some event or some perceived phenomenon to a cause dictated by emotion in a mind in which the critical consciousness of reality is still dominant." Reality, he holds, is the lamp from which emanates what light there is, and the essential source of all illumination. By this light the darkness of philosophy and the shadows of mysticism disappear, speculation takes wings and flies away, only the real remains.

The author is at his best in his fourth chapter, which treats of the awakening of medicine and its quickening and emancipation by the scientific spirit. Health is our goal and to that end all our energies are bent. "We have cast off all superstitions in this matter, and apprehend the fact that only by discovery, classification, and interpretation of the realities of the body can health be grasped." And so, by parity of reasoning, health of the spirit is to be achieved by similar means; the psychopath is to be cured by teaching him natural law. The trouble is that his mental state often prevents him from apprehending the significance of what he is being taught. Mr. Monsarrat is on firm ground when he applies his principles to science; whether they are true enough to run the whole world is a matter of belief—or doubt.

[8] *Health and the Human Spirit.* By K. W. Monsarrat, F.R.C.S.Edin. London: J. Murray. 1923. (Sup roy. 16mo, pp. 132. 5s. net.)

NOTES ON BOOKS.

WE welcome the second edition of Dr. ANDRÉ CROTTI'S work on *Thyroid and Thymus*,[9] the first edition of which was reviewed in the JOURNAL nearly five years ago. Every chapter, as we remarked at the time, shows an intimate knowledge of the subject, which is dealt with exhaustively from the medical, surgical, and pathological standpoints. There is, unfortunately, another side to the picture. In spite of the fact that the writer asserts in the preface that he has tried to take into consideration the criticisms of the first edition, the work is still marred by the defects to which we drew attention. There is the same inexcusable confusion in the arrangement of the first half of the book, and the English is still sadly in need of revision, nearly all the errors which we noticed before being reproduced. Lastly, although in deference to our suggestion a bibliography has been added, its bibliographical style is not uniform, many names and references are incorrectly spelt, and many names, some of considerable importance, which are mentioned in the text are omitted.

The medical practitioner is not usually a man of much leisure, and he is apt—quite rightly—to devote what leisure he has to such lighter forms of recreation as golf or bridge, although there are, of course, a goodly number of exceptions. Among them is Dr. WILLIAM MCCALLIN of Southampton, who finds in writing a pleasant recreation from medical work, and who has recently published a book of excellent short stories entitled *Ulster Fireside Tales*.[10] Dr. McCallin is himself an Ulsterman and an old student of Queen's College, Belfast. He is a bold author who writes his stories throughout in dialect, as does Dr. McCallin in nearly all his, but they gain, rather than lose, from being told in racy words redolent of the soil of Ulster. They are put into the mouth of an old Ulsterman, weaver and fiddler, and the author shows himself to be a keen observer and a philosopher of strong common sense. Most of the stories are about the varying fortunes of farmers, shopkeepers, and peasants—of wills, sales of farms, bargainings, and bankruptcies. Money, indeed, appears from these stories to play a very important part—if not the most important part—in the lives of Ulster folk. There are also, however, some pleasant little snatches of verse scattered among the stories. The author must be congratulated on an interesting and amusing volume of stories, but he would probably reach a wider public if he were content to keep the dialect for dialogue only, as he does very successfully in one story.

The sixth edition of the colossal work on therapeutic technique[11] edited by Professor J. SCHWALBE differs from the last, which was published in 1921, mainly by the addition of a section on obstetrical methods by Professors von Jaschke and Siegel and a considerable enlargement of the section on radiotherapy: the other sections have been revised. The section on urological technique, originally written by the late Professor Zuckerkandl, has been revised by Professor F. König of Würzburg.

[9] *Thyroid and Thymus.* By André Crotti, M.D., F.A.C.S., LL.D. Second edition, thoroughly revised. London: Henry Kimpton. 1923. (Imp. 8vo, pp. 774; 39 plates, 105 figures. 70s. net.)

[10] *Ulster Fireside Tales.* By William McCallin. London: Heath Cranton, Ltd. 1923. (Cr. 8vo, pp. 253. 7s. 6d. net.)

[11] *Therapeutische Technik für die aerztliche Praxis: Ein Handbuch für Aerzte und Studierende.* Herausgegeben von Prof. Dr. Julius Schwalbe. Sechste, verbesserte und vermehrte Auflage. Leipzig: G. Thieme. 1923. (Roy. 8vo, pp. 1182; 685 figures. Paper, £1 0s. 10d.; bound, 24s.)

In his book on the Villemin military hospital during the war[12] Professor FÉLIX LEJARS, who succeeded the late Professor Gaucher as officer-in-charge, has given an interesting account of the valuable work performed during the war in a Paris hospital which, though it had been condemned as out of date for over thirty years, possessed the great advantage of being near two important railway stations serving the front. In addition to instructive statistics relating to gunshot wounds, gas gangrene, amputations, tetanus, antityphoid inoculation, and influenza, the volume contains a vivid description of the difficulties attending the administration of such an antiquated hospital as well as of the important events in the life of the hospital during the war, such as the visits of Clémenceau during the bombardment by "Big Bertha," the decoration of dying men, the funeral of Gaucher, and the celebration of armistice day. The book, which is written in a mildly satirical vein, will particularly appeal to those surgeons who, like Professor Lejars, suddenly found themselves during the war placed in charge of a military hospital without any previous military training.

The second volume of Richter's *Organic Chemistry* dealt only with the class of substances termed carbocyclic, or those formed from ring nuclei containing no atom but carbon in the ring. The third volume[13] now issued treats of the heterocyclic compounds of organic chemistry, or ring compounds of carbon in the formation of which atoms of the inorganic elements participate. These comprise the furane and thiophene derivatives; the indole group, under which heading are given the various syntheses of indigo which have been accomplished; the pyrazolines, of which antipyrin is a member; the pyrones, which include the meconic acid of opium; and also the pyridine and quinoline series, among the members of which are found most of the important alkaloids. The composition and style of compilation are as in the preceding volumes, leaded type being used for the names of substances under description and italics for those coming incidentally under reference. Condensation continues to be a conspicuous feature of the work: it is the inevitable result of an endeavour to mention every substance registered in original treatises. But the drawback resulting from condensation is repaired very well, first by the arrangement, and secondly by the skill shown in selecting for mention the most salient facts. When tested by referring to specific subjects it is found that nothing of outstanding importance is omitted. The whole is very completely indexed. No book could be more desirable for general reference on the chemical constitution and relationships of organic materials.

In a popular Sunday afternoon lecture at the Harvard Medical School, which formed one of the series of the Harvard Health Talks, Dr. F. T. LORD, physician to the Massachusetts General Hospital, gives in clear language a thoroughly up-to-date account of *Pneumonia*,[14] which in the United States of America is responsible for 10 per cent. of all deaths, and was therefore called by the late Sir William Osler "the captain of the men of death," the phrase applied by John Bunyan to pulmonary tuberculosis. This lecture gives a description of the types of pneumococci, Types I, II, and III being the fixed types, and Type IV a heterogeneous group; Types I and II are rarely present in the normal mouth, whereas Types III and IV are common, more than 50 per cent. of healthy persons having some kind of pneumococcus in their mouths. Sixty per cent. of the cases of lobar pneumonia are due to pneumococcus Types I and II, and as these organisms are rarely normal inhabitants of the mouth the disease is due to infection, whereas the 40 per cent. of pneumonic cases due to Types III and IV may be regarded as due to auto-infection under conditions of increased virulence. About a third of the cases of pneumonia Types I and II prove fatal, nearly a half of Type III, and only one-eighth of the cases of Type IV pneumonia. The mechanism of the crisis in lobar pneumonia is explained as due partly to a progressive rise in the general resistance to the pneumococcus, and partly to a local increase in the acidity of the lung whereby the acid death point of the sensitive pneumococcus is reached. In bronchopneumonia Types III and IV are more common than the other two. The prevention of pneumonia by various precautions and also by inoculation with a pneumococcus vaccine is described, and an account of the treatment both by general measures and by the Type I pneumococcus serum is given. Although intended for lay hearers, the lecture provides medical men with a short and useful summary of the most modern conception of the pneumonia question.

[12] *Un Hôpital Militaire à Paris pendant la Guerre, Villemin 1914–1919.* By Félix Lejars. Paris: Masson et Cie. 1923. (Imp. 16mo, pp. 364. Fr. 10.)

[13] *Organic Chemistry, or Chemistry of the Carbon Compounds.* By V. von Richter. Edited by Professor R. Anschütz and Dr. H. Meerwein. Vol. iii: Heterocyclic Compounds. Translated from the eleventh German edition by E. E. Fournier D'Albe, D.Sc., A.R.C.Sc. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1923. (Demy 8vo, pp. xviii+326. 25s. net.)

[14] *Pneumonia.* By Frederick Taylor Lord, A.B., M.D. Harvard Health Talks No. 9. Cambridge, Mass., and New York City: Harvard University Press; London: H. Milford, Oxford University Press. 1922. (Fcap. 8vo, pp. 69. 4s. 6d. net.)

FACTORY HYGIENE.

ANNUAL REPORT OF THE CHIEF INSPECTOR.

IT is becoming increasingly noticeable with each successive year of publication of the Annual Report of the Chief Inspector of Factories how much the work of the Department is altering in its character and scope. The introduction of scientific medical investigation into the factory, a great forward movement in itself, has brought to light so many definite causes of ill health that experts of various kinds have had to be extensively requisitioned to devise methods and means for affording the necessary protection for the workers. The fillip given during war time to the intensive study of the physiology and pathology of fatigue and of the human factor in accident causation has had its influence in the production of welfare schemes and "safety first" movements, and the rapid progress made by electricity as a motive power quite recently brought about the necessity for creating a special section of the inspectorate. It is, therefore, not surprising that Mr. G. Bellhouse, in this his first report (for the year 1922)[1] as Chief Inspector, should make a point of explaining that his object is to give a general picture of the work of his department and to enlarge more particularly upon subjects that have been occupying the special attention of his staff. This he has done very satisfactorily.

The low ebb at which trade conditions have remained has apparently accounted for the marked decrease in routine work, but *pari passu* this circumstance appears to have provided not only more time and opportunity for special investigations by the department but has been taken advantage of by firms to modernize their plants and improve their methods against the turn of the tide, distinct signs of which are said to be in evidence.

Some indication of the extent of trade depression is provided by comparing the numbers of examinations during the year for certificates of fitness, 267,964, with the pre-war figure of 529,491 for 1913. Medical examinations under special rules and regulations were 212,195, as against 175,735 for 1921 and 225,678 for 1920; the number of accidents was 97,986 (including 843 fatal), an increase of 5,421 over the previous year. It does not appear likely that any of these figures have been materially affected by the formation of the Irish Free State.

In dealing with the safety problem mention is made of the attention again devoted to trade agreements respecting fencing and precautions, and there is an excellent section describing the risks of bursting of revolving discs, wheels, and centrifuges due to centrifugal stress. Under the heading of dangerous trades it is stated that twenty-nine codes of regulations were in force at the end of the year, the recent ones being those for aerated water, hides and skins, celluloid, india-rubber, and chemical works. There is the usual chapter on the dangers from electricity and two special chapters by the senior engineering inspector, one of the latter dealing with the risks arising during repairs to oil-carrying ships.

The work of the medical section is, as usual, described by Dr. T. M. Legge, but in addition there are two special reports, one by Dr. E. L. Middleton and the other by Dr. Eileen Hewitt. Dr. Legge gives his usual table showing the number of notifications of industrial poisoning, epithelioma, and anthrax during the year, and comparing these with the yearly incidence since 1900.

Lead Poisoning.

The lead cases were 247, with 26 deaths, as compared with 1,058, with 38 deaths, in 1900. The pottery trade heads the list with 42 cases and 17 deaths; the accumulator industry provides 32, with no deaths; plumbing and soldering

[1] (Cmd. 1920.) To be purchased through any bookseller or directly from H.M. Stationery Office. Price 5s. net.

25 and no deaths; the white and red lead manufacture 22 cases and 2 deaths; and a considerable number with few deaths, are attributed to the use of paints in various industries. Attention is directed to the disproportionate mortality in pottery cases, as compared with the rest, and to the difference in the pottery figures themselves since the Workmen's Compensation Act of 1906 came into force and allowed compensation for deaths due to such sequelae as chronic Bright's disease. The differences are graphically shown in a case mortality table. Another interesting point is the higher paralysis (12.2 per cent.) among men than among women (4.7 per cent.), and the converse in cases of encephalopathy, which shows 2 per cent. for men and 3 per cent. for women. Reference is made to the increased safety in the rubber trade through being able to purchase the necessary lead already incorporated with rubber and other materials instead of introducing it dry into the mixer. The use of oxy-acetylene flame in the breaking-up of battleships has again accounted for a number of cases. Leaflets showing the dangers of lead absorption and the means of preventing this have been drawn up for the use of the Joint Industrial Councils of the Printing and Allied Trades and the Paint and Decorating Trades respectively. No cases of arsenic or phosphorus poisoning were notified, but there were 6 cases of mercurial poisoning, with 1 death, and 3 cases of toxic jaundice.

Anthrax.

Anthrax accounted for 45 notifications, 5 cases being fatal. That only three notifications came from Bradford is ascribed to the disinfection of East Indian goat hair at Liverpool. The mortality is only about half what it was prior to 1906 owing to modern expeditious treatment with Sclavo's serum. The Advisory Committee of the International Labour Organization resolved, in December, that hair for brush-making and upholstering should be disinfected before using industrially, and that hair and wool for textile purposes should also be so treated except in certain specified circumstances; also that flocks should be dealt with by compulsory notification and verification, isolation, disinfection, preventive inoculations, and complete destruction of infected carcases. This committee recognizes the impossibility of complete disinfection of hides and skins at the present time, and strongly recommends grants-in-aid for international research in this direction.

Poisonous Chemicals.

Forty-two cases of chrome ulceration had been reported, 10 in the manufacture and 32 in the use of potassium or sodium chromate, but Dr. Legge anticipates a diminished incidence with a better understanding of the Chrome Dyeing Welfare Order by the workers. There were 32 cases, with 3 deaths, from epitheliomatous ulceration, and under this heading reference is made to the value of the discussion at the Glasgow meeting of the British Medical Association in showing the importance of the figures now available in their bearing on the experimental work being carried on. It is stated that more and more time has to be devoted by medical inspectors to investigations of dermatitis; celluloid substitutes, shellac varnish, sugar, teak wood, "Accelerene" (rubber vulcanizer), cracking of Brazil nuts, orange peeling, lubricating oil, and phosphorus sesquisulphide all produced cases during the year.

Cases of poisoning from accidental escape of fumes and gases were 194, of which 20 proved fatal, carbon monoxide with 111 and 14 deaths heading the list. Defective fittings and inadequate ventilation of gas stoves accounted for 28 cases of CO poisoning in workrooms. Of the 10 cases of chlorine poisoning, 6 occurred from the use of cylinders of this gas in the bleaching of flour. Sulphuretted hydrogen, ammonia, benzine derivatives, naphtha, petrol, nickel carbonyl, carbon bisulphide, and sulphur dioxide were other causes of poisoning. Owing to a request from the International Labour Office an inquiry was made into the alleged ill effects of photo-engraving, but occurrence of serious illness was not confirmed, a material improvement of conditions having undoubtedly been brought about since the introduction of specially designed baths. A very similar result followed an investigation by Dr. Middleton into the etching of stainless steel.

Industrial Hygiene and Welfare.

The standard of first-aid and ambulance arrangements under Welfare Orders is considered to be well maintained. There is, however, complaint of irregularity in keeping up the supply of sterilized dressings in first-aid boxes; also Dr. Henry has noted that of the ambulance rooms in charge of a trained nurse, out of 42 visited, only 5 were under the supervision of a medical man, so that consequently medical inspectors have been called upon to discourage the indiscriminate use of drugs which was getting quite a practice where such are stocked in the ambulance room. It is also thought that much more propaganda work is needed. Of the 267,964 young persons examined for certificates of fitness a table shows that the detailed diseases and physical defects demanded the rejection of 5,318 and the imposition of conditions on 6,673, also that attention was directed to unsuitable attire (and loose hair) in 1,031 cases. It is stated that the increasing general interest in the effects of industrial employment on health is manifest in the greater importance attached by both employers and employed to the examinations by the certifying surgeons. It is, however, regarded as unsatisfactory that the surgeon's function does not extend to re-examinations. Note is made of the very desirable co-operation existing between welfare supervisors and certifying surgeons and the valuable assistance rendered by Dr. Henry in bringing this about.

Siliceous Dust.

Dr. Middleton reports on his investigations into the dust content of the atmosphere of workplaces for the grinding of metals and cleaning of castings. Using the very effective dust-counting apparatus recently invented by Dr. J. S. Owen of the Meteorological Office, Air Ministry, he collected a very large number of samples from the air of workrooms in which these processes are carried on, and his results, being the first obtained from this method of collection, are necessarily important. He confirms the view that silica derived from sandstone or other natural rock is the prime cause of fibroid phthisis and shows that it is the very small particles, invisible under ordinary conditions of indoor illumination, which causes the damage. These minute spicules diffuse through the air and are thus dangerous to others as well as to the actual grinder. He states that they are thrown off very extensively in wet sandstone grinding and that the dressing of grindstones causes an intense saturation of the atmosphere. A copious application of water at the point of contact of metal with abrasive and the association of dry grinding with an efficient exhaust are regarded as the most effective means of securing a minimum pollution. The cleaning of castings does not appear to be associated with the evolution of large quantities of fine silica dust.

Weight Carrying by Women.

Dr. Eileen Hewitt reports on her investigations into the comparative physiological costs of different methods of weight carrying by women. She used in her experiments the Douglas-Haldane method of collecting, measuring, and analysing expired air. The carbon dioxide output and oxygen consumption at different times were thus determined and the energy expended in calories was calculated. Various methods of carrying were used in the experiments, and she concludes that no one method should be employed continually when transporting weights of over 35 lb. She states that heavy loads carried at the front, especially when helped by a neck strap, tend to cause round shoulders, and that shoulder carrying on a board tends to create lateral curvature. Adolescents should not use this latter method and adults should learn to utilize each shoulder alternately. The method of loading and laying down is believed to be of great importance, and the unloading level should, as near as possible, be in line with the shoulder. So far as could be ascertained the physiological cost of work is not objectively affected by menstruation.

THE HEALTH HISTORY OF MANCHESTER.

On his retirement after nearly thirty years' work as medical officer for Manchester, Dr. James Niven has put the city permanently in his debt by writing a history of its public health.[1] Locally the volume will be invaluable, not only for its careful and detailed account of the work of the health authorities in Dr. Niven's time and that of his predecessors, but also for his frank and shrewd observations made on the methods of local government, and for advice as to the future. These parts of the history will be of special interest and profit to his colleagues throughout the public health service of Britain. The book is a plain, straightforward story, entirely free from rhetoric. The title of the first section is "Forms of Dirt," whilst the smoke nuisance is dealt with under a heading consisting of the single word "Blacks." In the first paragraph of his introduction Dr. Niven plunges at once *in medias res*, and regrets that he has not been able to exterminate the elusive house fly, with its large responsibility for summer diarrhoea. Generous appreciation of the work of his assistants and colleagues is a feature of his writing, especially perhaps as to the aid which he received from the late Professor Delépine, who conducted many valuable laboratory investigations. That Dr. Niven kept himself always up to date in his acquaintance with the progress of scientific research on matters in his own sphere has helped to make him a wise and safe guide in the health administration of one of the great cities of the empire.

After his initial discourse on the influence of dirt, he goes on to write about Manchester's hospitals and sanatoriums, its infectious diseases, devoting separate sections to venereal diseases and tuberculosis; then he proceeds to milk, foodstuffs, and food poisoning, including an account of the great outbreak of arsenical poisoning in beer drinkers at the beginning of the present century. He next takes up the history of housing in Manchester, and maternity and child welfare, and concludes (apart from some observations on statistics) with an important section on the evolution and present constitution of the Public Health Department.

Within the limits of this article it is impossible to follow the volume through all its sections, but everything about housing is of special present interest. Dr. Niven says:

> Manchester is a city of cottage dwellings, the prevailing type being the four, five, or six-roomed house. Houses therefore cover a large area in proportion to the number of persons to an acre, as the tenement dwelling has found no acceptance and no home outside the centre of this city. One effect of this is an aspect of dreary monotony.

It is well to remember, therefore, that even cottage dwellings may be monotonous, and to take note of this in new building schemes. Ultimately, of course, there comes the rival claim of convenient nearness and accessibility to daily work, to be met so far by travelling facilities. Manchester's first building by-laws were in 1868, and did not require even damp-proof courses, but insisted on a minimum street width of thirty feet. Even these by-laws were of some use, while those of 1890 and 1908 were better, but the latter were passed just before the building slump. In the older parts of the city back-to-back houses abounded, usually of two apartments, with filthy privies standing in stacks in courts or at street ends. Various areas were dealt with under the Housing Acts, and ground was bought for buildings, but an experiment of a five-story tenement was a failure and not repeated, two stories being much more acceptable. The problem of the 10,000 back-to-back houses was tackled, and vast improvement effected. So the story of constant effort goes on, and Dr. Niven records that an immense result has been achieved, though over considerable areas houses are deteriorating, and ought to go "not one by one but in areas." In Manchester, however, as elsewhere, "private building of cottages appears for the time to have been extinguished, and the State has accepted the obligation," but State-aided houses are up till now few in number, and almost restricted to discharged service men, so that the general body of the people are little better off than before, and if the new houses were there "most persons could not pay the rents." How, then, is the situation to be met? In answer to that question Dr. Niven asks another: "Can we not resolve to follow the example of America and go dry? Can there be any doubt that the liquor trade paralyses the hands of the social reformer and keeps the people poor?"

Of all the great cities of Britain Manchester can less than any other be regarded as a unit independent of its neighbours. If a man goes outside of Glasgow he may straight away find himself at the Kyles of Bute, or on Lochlomond-side, or in Strathendrick; if out of Edinburgh he is into the Scott country or at Dunbar or Gullane. But if he gets out of Manchester it is only to transfer himself to Salford or Bolton or Oldham. And so, even in housing reform Manchester could act only very incompletely by itself, and Dr. Niven justly congratulates himself that over a hundred sanitary authorities within fifteen miles of Manchester have joined with it to make their town-planning arrangements and main roads and transport fit into one another.

Dr. Niven's volume shows throughout that he has not confined his work within narrow or official limits. He has been in co-operation with the social activities of Manchester, as with a guild established by ladies in 1908 to assist mothers in various ways, by lessons in hygiene, sewing, cookery, and medical consultation centres. Valuable service was rendered in feeding mothers and children in the distressed period 1915-16, and subsequently under an order of the Local Government Board, but questions arose as to such relief being given where not justified, and on investigation the system had to be changed. Even yet "it is no easy matter to be sure that public money is properly expended," and in a passage which illustrates Dr. Niven's strong common sense he writes:

> "It is a pity that the work of the centres should be inwoven with a scheme for the sale of milk under cost, as it makes it difficult to determine when an advance in the popularity of the centres is due to appreciation or to material aid. Such aid should, as far as possible, be confined to periods of distress. In my opinion, the maternity and child welfare centres are now strong enough to keep their hold when this form of assistance is withdrawn, or rather when it is reduced to a minimum and kept strictly controlled."

Similar experiences have led to similar conclusions in America.

In the latter part of his history Dr. Niven has a good deal to say about health visitors and the value of their work, which was a subject of special investigation in 1911. At that time the training would be more elementary than now, and the period inquired into was too short to allow a final conclusion, but "the investigation brought home to us the vital need for constant supervision and unceasing training of the whole staff." He was struck by failures to appreciate the importance of regular and accurate weighing of children, and he concludes epigrammatically that "a good portable weighing machine is the clinical thermometer of the health visitor." In reviewing the present position, however, he holds that much success has been due to the house-to-house visits of health visitors, and the associated education of mothers at the maternity and child welfare centres.

There is temptation to add to these notes, but space forbids. The Corporation of Manchester is to be heartily congratulated on having had Dr. Niven as its medical officer for nearly thirty years, whilst Dr. Niven is to be congratulated on the completion (officially only) of a splendid life-work, and on the health annals which he has put on permanent record at its conclusion. His colleagues, we are sure, will miss him sorely, but they will hope that he may be long spared to encourage and advise those who are still in the fighting line.

[1] *Observations on the History of Public Health Effort in Manchester.* By James Niven, M.A., M.B., LL.D. Manchester and London: John Heywood, Ltd. 1923. (Med. 8vo, pp. 230.)

According to recent statistics the mortality from diabetes in the United States is much higher in the white population of the north-eastern States than in the south and west. New York has 22 deaths per 100,000 inhabitants due to this cause annually, while Tennessee has only 6. Negroes show little susceptibility to diabetes in contrast with the Jews and Irish, who pay heavy tribute to the disease in New York and New Jersey.

British Medical Journal.

SATURDAY, SEPTEMBER 15TH, 1923.

BACTERIAL TYPES AND VARIANTS.

THE close comparison of individual strains of certain pathogenic bacteria that has been carried out of recent years has brought about a revision of ideas previously current with regard to the constitution of these micro-organisms. Only a short time ago the frontier of pathological knowledge was reached when we were able to ascribe lobar pneumonia to the pneumococcus, cerebro-spinal fever to the meningococcus, and diphtheria and tetanus to the well known bacilli causally related to these diseases. As a result chiefly of the application of modern developments of serological technique, we now know that within each of these pathogenic representatives of the schizomycetes there exist a number of separate groups or types antigenically distinct from one another, which appear to breed true and to maintain at any rate the chief portion of their antigenic individuality for an indefinite period, since attempts so far to convert one type into another have failed. The majority of those who have investigated this matter are agreed that each case of pneumonia, cerebro-spinal fever, diphtheria, or tetanus is brought about by a single type of the infective micro-organism; and carriers also exhibit a similar loyalty to the particular type infecting them. The pneumococcus and meningococcus have been the most thoroughly studied from the present point of view; though a considerable number of different types exist, a comparatively small proportion of them are responsible for the majority of the cases.

This internal differentiation of infective units previously assumed to be indivisible is not only of bacteriological and epidemiological interest; for the pneumococcus and meningococcus it has been found to be of cardinal importance as regards success in specific therapy. According to present observations, patients suffering from disease brought about by these micro-organisms are not benefited by serum unless it has been prepared against a strain of exactly the same type as that infecting the patient. In diphtheria and tetanus, on the other hand, where the chief pathogenic factor is a toxin which is readily soluble and diffusible, the question of type is far less important, since here it has been found that antitoxin prepared against the toxin of one type neutralizes that of all the others. From the careful studies of Tulloch, however, on the distribution of types of the tetanus bacillus in the wounded during the war it seems possible, if not probable, that the difference in antigenic constitution obtaining between the various types of the tetanus bacillus is not entirely without influence in the genesis of that disease.

Are these types fixed and permanent, or is a process of evolution and natural selection going on, younger and more virulent types coming to the fore while the older and attenuated go to the wall? At present we have not sufficient knowledge to answer this question. All we can say is that so far as the available evidence goes, the types that have been most studied seem to be fixed variants of a parent strain of unknown antiquity.

Bacterial variation in one form or another has been familiar for a long time past to bacteriologists, who, when dealing with an organism which, as the result of prolonged culture on artificial media, has lost some of its characters, are accustomed to restore them by the time-honoured expedient—first devised by Pasteur—of passing it through an animal. The systematic study, however, of bacterial variation by serological as well as other methods of investigation is of quite recent date. Thus some two years ago it was found by Arkwright that in pure cultures of dysentery, typhoid, and paratyphoid bacilli, two forms can be distinguished by the roughness or smoothness of their colonies, and that these forms also present some differences in antigenic respects. Andrewes similarly found evidence of some antigenic variation within pure cultures of examples of the Salmonella or food-poisoning group, and has submitted the matter to elaborate study.

The latest contribution is by Dr. F. Griffith of the Ministry of Health,[1] who has found that virulent pneumococci become attenuated by growth in homologous immune serum, and that the rough colonies of the attenuated cocci are distinguishable from the smoother colonies of the virulent forms, and further that these two forms present some differences in antigenic respects. He notes that on subculture the attenuated strain may either revert to the other or remain unchanged. In a paper issued with the same report Dr. Eastwood gives a sketch of the present somewhat slender knowledge of bacterial variation, and boldly discusses its relation to the phenomenon of transmissible autolysis of Twort and d'Herelle. Whatever may be the ultimate verdict as regards the mutual relationship of two processes so apparently distinct, this latest contribution to the study of bacterial variation cannot fail to promote interest in a subject of practical as well as academic importance.

THE NUCLEAR ATOM.

EVERYONE who has followed even in the most general way the progress of what may be called the physics of the atom is aware that ideas have been revolutionized, and that the revolution dates from the discovery of x rays and of the radio-active elements. We have all been aware that physicists during the last quarter of a century have eagerly used the new methods of research these discoveries placed in their hands to probe into the constitution of matter and the nature of the atom, but we shall all be grateful to Sir Ernest Rutherford, who has had so large a part in the acquisition and the interpretation of the discoveries, for telling the story, defining the present position, and indicating the directions which research will probably take in the near future. The abstract of his presidential address to the British Association in which he did this is published this week (p. 474); it gives a complete account of his general argument, with details sufficient to show the line of reasoning he followed in relating the astonishing results already reached.

The atom was defined in a popular textbook of last century as the "smallest and chemically-indivisible particle of each element which can exist . . . united with other particles either of the same or of different elements, but which is not known in a separate form."

[1] Ministry of Health. Reports on Public Health and Medical Subjects. No. 18. London: H.M. Stationery Office. 1923. 1s. net.

It possessed certain properties and a certain mass, and was the ultimate piece of stuff of that particular element; it was regarded by the general student and investigator as not only indivisible but homogeneous. The new work has proved that the atom is not homogeneous, but is built up of particles of positive and negative electricity arranged in an orderly way. Moseley, whose death was among all the losses to science inflicted by the war probably the greatest, had found a new order for the elements in atomic number, mounting by a whole number which varied by unity in passing from hydrogen 1 to uranium 92; it revealed a relation of unforeseen simplicity between the elements. Most of the numbers between 1 and 92 were occupied by known elements, and among the blanks one at least has been filled by hafnium, to the discovery of which Coster and Hevesy of Copenhagen were led by the vacancy for the atomic number 72 disclosed by Moseley's law. This law has thus already not only explained old facts, but pointed the way to the discovery of new—the two supreme tests of the validity of a scientific hypothesis.

Moseley worked on the theory of the nuclear atom, which is that an atom consists of a very dense nucleus, a particle of positive electricity (proton) surrounded by a planetary system of particles of negative electricity (electrons). The first atomic number is occupied by hydrogen, which has a nuclear charge of one, and one electron moving in an orbit, approximately circular, around it; the second, helium, has a nuclear charge of two, and two electrons. These two electrons, the "K" group, are common to all the elements with an atomic number above hydrogen; new groups are added as the atomic number rises until we reach uranium, which we must conceive as having at its centre a minute nucleus surrounded by swirling groups of 92 electrons moving at varying rates, the speed depending on their closeness to the nucleus. So that while the outermost electrons have a minimum speed of something over 1,000 kilometres a second, the innermost "K" electrons have a speed of more than 150,000 kilometres a second, or half the speed of light.

The electrons occupy, but do not fill, a volume very large compared with that of the nucleus. Dr. Aston, in an address to the British Association when it met in Hull last year, said that even in the heaviest atom known the constituent charges failed to fill even the million-millionth part of this whole volume. The theory of the nuclear atom was put forward by Rutherford in 1911, and the nucleus must be conceived as extremely small compared with the whole atom; thus Dr. Aston said: "If in the atom of helium (atomic weight 4, atomic number 2) we take the nucleus consisting of four protons and two electrons as represented by a rather large pea, its planetary electrons may be represented on the same scale as two rather smaller peas revolving around it at a distance of a quarter of a mile." As this quotation from Dr. Aston suggests, physicists are carrying their inquiries still further and are attempting to ascertain the structure of the nucleus. Already certain investigations by Sir Ernest Rutherford himself and Dr. Chadwick leave very little room for doubt that hydrogen nuclei form the essential part of the nuclear structure. The conclusion is forced that the nucleus of a heavy atom is a very complicated system. When the mass of the nucleus is compared with its volume it seems certain that its density is many billion times that of our heaviest element, yet it is probably a discontinuous structure occupied but not filled by the incredibly minute building units, the protons and electrons, in ceaseless rapid motion controlled by their mutual forces.

It has been supposed that hydrogen may be built up into helium; were this to occur energy would be set free, and calculation shows that the amount so liberated would be prodigious; if the hydrogen contained in a pint of water could be transmuted the energy furnished would, Dr. Aston has estimated, be sufficient to propel a big liner across the Atlantic and back again at full speed. But there is no certain experimental evidence that helium can be formed from hydrogen; the process may be going on in the sun, and it has been calculated that this synthesis of helium need only take place slowly in order to maintain the present rate of radiation from the sun for periods of the order of a thousand million years. Sir Ernest Rutherford discourages the extravagant hypotheses put forward some ten years ago with regard to the stores of energy hidden in the atoms of an element. He, on the contrary, suggests that uranium and thorium represent the sole survivals in the earth to-day of types of element common in the long-distant ages when the atoms now composing the earth were in course of formation. Some atoms of uranium and thorium have, owing to their slow rate of transformation, survived, and may be regarded as having not yet completed the cycle of changes which the atoms of other elements have long since passed through. On this view the presence of a store of energy ready for release is not a property of all atoms, but only of a special small class, like the radio-active atoms, which have not yet reached the final state for equilibrium.

Though Sir Ernest Rutherford dealt with an extremely complicated subject, involving conditions of matter very difficult to visualize, it is stimulating to read at first hand the views of one who has himself had so large a part in the astonishing progress which has been made. Every civilized nation has taken an active part in the study of the problem, but, as he said, "we may be justly proud that this country has made many fundamental contributions." He did well to include the British dominions overseas, where workers have not been behindhand with their contributions; and it is, we may hope, significant of the oneness of the British Empire that Professor Rutherford himself is a New Zealander, and that he was Professor of Physics in McGill University, Montreal, before he became professor in the same subject in the University of Manchester, a post he only vacated four years ago to succeed Sir J. J. Thomson as Professor of Experimental Physics and Director of the Cavendish Laboratory of the University of Cambridge.

THE AUSTRALASIAN CONGRESS OF THE BRITISH MEDICAL ASSOCIATION.

THE Australasian Medical Congress—the first to be held under the direction of the Federal Committee of the British Medical Association in Australia—will open in Melbourne on November 12th; it will meet under the presidency of Mr. G. A. Syme, M.S., F.R.C.S., and the parent Association will be fitly represented by Sir William Macewen, F.R.S., the distinguished Regius Professor of Surgery in the University of Glasgow, and President of the British Medical Association last year. He is expected to arrive in Sydney about October 17th, by the mail boat from San Francisco, and will be the guest of Sir Walter Davidson, Governor of New South Wales. He will be entertained at dinner by the members of the Glasgow University Club on October 22nd, and by the New South

Wales Branch on October 24th. In Melbourne he will be the guest of the Governor of Victoria, Lord Stradbroke, and afterwards of Lord Forster, the Governor-General of the Commonwealth. The arrangements for the congress are now far advanced, and everything gives promise of a most successful gathering. There will be twelve sections, the presidents being selected from the various States of the Commonwealth and from New Zealand. An exhibition of trade products, including medical and surgical instruments, books, drugs, foods, and other articles of direct interest to the medical profession, will be held in the new anatomy department of the University of Melbourne during the congress. This new department, the erection of which was begun in January, 1922, will be very complete. It will have two dissecting rooms, each capable of accommodating 300 students, a well equipped museum, and a large theatre. It will also provide a histological laboratory to accommodate 250 students, and special rooms for operative surgery, neurology, and physical anthropology. It is hoped that Sir William Macewen will accept the invitation of the University Council to take part in the opening ceremony during the congress.

THE RED CROSS AND ORDER OF ST. JOHN.

THE third report of the Joint Council of the Order of St. John of Jerusalem and the British Red Cross Society[1] contains an account of the services conducted by the Council, the report of the finance committee, and a financial statement. The departmental reports record a very large amount of useful work done on behalf of ex-service officers and men. The Department of Auxiliary Hospitals for Officers has dealt with 359 new cases, bringing the total number of officers assisted since August, 1914, to 16,862. Many of the patients suffered from tuberculosis, and these have been assisted in obtaining sanatorium treatment at home or abroad. Other patients have been treated at the Officers' Hospital at Brighton. The Emergency Help Committee was set up by the Council in December, 1920, with an initial grant of £100,000, for the purpose of granting temporary relief in emergencies to ex-service men suffering from sickness or disablement attributable to or aggravated by their war service. The committee has tided many men over the period of delay in settling their claims for pensions. The administration of the emergency help scheme is carried out through county and borough directors. In many places there are committees representing kindred charitable organizations under the chairmanship of the director. The Emergency Help Committee works in constant touch with the Ministry of Pensions, and brings to its notice all cases in which decisions appear to be unreasonably delayed or in which interpretations placed on the Royal Warrant have operated harshly. The total expenditure in grants during the year was £124,700. At the beginning of this year the Central Joint V.A.D. Committee was reconstituted by the Army Council, in order that the voluntary aid detachments might be called upon to supplement not only the Territorial Army, but also the Royal Navy, the Regular Army, and the Royal Air Force. The Central Joint V.A.D. Committee now includes representatives of the Admiralty, the War Office, the Air Ministry, the Territorial County Associations, as well as of the Order of St. John and the British Red Cross Society. The chairman of the Committee is Sir Humphry Rolleston. During the year a new convalescent Home has been opened at Eddlewood, Weybridge, the funds for which were presented by the United Services Fund. There is also a holiday hotel at Folkestone and a residential club in London. The last unit of general service V.A.D. members returned from Constantinople in May, 1922, and was demobilized. The report of the Stores Department will no doubt captivate popular imagination with its millions of cigarettes, thousands of pounds of tobacco, its gramophones and Christmas parcels distributed to pensions hospitals. But a more solid achievement from the medical point of view is the development of the home ambulance service. There are now over 320 ambulance stations established throughout the country, a large number being operated entirely by voluntary workers, and the ambulances are carrying over 1,000 patients a week, for many of whom treatment would have been out of reach owing to lack of means of transport. Thirty-three new ambulance stations were established during the year. The work of the service is confined to the provinces, because the provision of ambulances for the public service in London is vested in certain public authorities. It is to be hoped that the Council's appeal for support in order that old ambulances may be replaced as required will meet with success, if only for the purpose of comparing the results of voluntary effort in the provinces with municipal and other departmental organization in London. The work of the Joint Council seems to be extremely efficient, and even on the financial side the position seems not unsatisfactory.

[1] Third Report of the Joint Council of the Order of St. John of Jerusalem in England and the British Red Cross Society, from April 1st, 1922, to March 31st, 1923. 19, Berkeley Street, W.1.

EDIBLE AND POISONOUS FUNGI.

AN interesting note on edible and poisonous fungi, their characteristics and composition, appears in the introduction to Mr. John Ramsbottom's *Handbook of the Larger British Fungi*, recently published by the Trustees of the British Museum.[1] In this country only the field-mushroom (*Psalliota campestris*) and the horse-mushroom (*P. arvensis*) are commonly eaten, though many of our common toadstools have a much more delicate flavour. But indiscriminate eating of toadstools is not a pastime to be indulged in, for, although there are far fewer poisonous species than is popularly supposed, some are extremely dangerous. In order to tell whether a fungus is edible or poisonous one must be able to distinguish it and know its record. Nevertheless, there is a prevalent idea that by subjecting a fungus to one or other simple test it can easily be ascertained whether it may safely be eaten. Though the belief in many of these tests is common throughout the world, we have Mr. Ramsbottom's word for it that not the slightest reliance can be placed upon any of them. He then proceeds to demolish, one by one, four of the most common of these beliefs. The remaining rule-of-thumb methods are equally useless; the only way in which to benefit from the experience of others is by learning to recognize the species concerned, and by never eating a fungus until its identity is certain. This manual should prove very useful in helping people to acquire the necessary knowledge. The author groups the poisonous effects of these plants under four headings: (1) natural idiosyncrasy; (2) simple indigestion, due to bad cooking or overindulgence; (3) poisoning by old and altered fungi; (4) specific poisoning. Under the second heading he remarks on the unwisdom of making a heavy meal of mushrooms on returning from a long walk fatigued and hungry, and adds that fungi should never be eaten alone. Though a complete food, their nutritive value has been much exaggerated; the amount of nutriment is very small compared with their bulk, and their chief value is as appetizers, giving variety and flavour to other more nutritious foods. The most deadly of the poisonous varieties is the common *Amanita phalloides*, which accounts for 90 per cent. of the deaths caused by fungi. A paper on the poisonous constituents of this toadstool was read by Dr. W. W. Ford in the Section of Pathology of the Annual Meeting of the British Medical Association in Montreal.[2]

[1] *A Handbook of the Larger British Fungi.* By John Ramsbottom, O.B.E., M.A., F.L.S. London: Printed by order of the Trustees of the British Museum. 1923. (Demy 8vo, pp. iv+222; 141 figures. 7s. 6d. net.)

[2] BRITISH MEDICAL JOURNAL, December 1st, 1906, p. 1541.

At that time (seventeen years ago) well over 300 fatalities from eating it had been recorded in medical literature. Dr. Ford concluded that the active principle of the plant was an alkaloid—"amanita toxin"—a heat-resistant substance devoid of haemolytic properties. Unfortunately no antidote is known, and treatment must follow general lines; a vivid account of the toxic symptoms is given in Mr. Ramsbottom's book. *Amanita muscaria*, with its bright red top studded with red spots, is of course unlikely to be eaten in mistake for the common mushroom; it contains muscarin, myceto-atropine, and choline, and is therefore very poisonous, though far less so than *A. phalloides*.

ANTHRAX IN TANNERIES.

THE International Labour Office, as a result of a resolution passed at the third session of the International Labour Conference held at Geneva in 1921, set up an Advisory Committee on Anthrax, which, at a meeting in London in December, 1922, proceeded to examine the problem of disinfection of hides and skins. It has long been known that the principal risks of infection from anthrax arose from handling these articles of commerce, but hitherto no process of disinfecting them which offered adequate protection against anthrax spores has been determined. The International Labour Office consequently secured the collaboration of Dr. H. Leymann of the Federal Ministry of Labour, Berlin, for many years recognized as a leading authority in the field of industrial hygiene, to report on the occurrence of anthrax among workers in the tannery industry and on the most modern methods of disinfecting hides before or during the process of tanning. His investigations are now published by the International Labour Office.[1] The statistics of the incidence of anthrax tabulated by Dr. Leymann, although they refer to Germany only, are of much interest and value. They show clearly that the chief sources of infection are imported ox-hides and cow-hides; and that during the years of the war and after, when the importation of hides practically ceased or was greatly restricted, the cases of anthrax decreased to a remarkable extent. In the period 1910-21 there were 1,575 cases, of which 249 were fatal, but while the number yearly from 1910 to 1914 was approximately 200, in 1915 there were only 67 cases, and in 1919 only 18. In Germany compulsory notification of anthrax is in force, and from information obtained in this way it was shown that outbreaks occurred amongst cattle pastured in valleys of rivers and streams on whose upper reaches tanneries which dealt with imported hides and skins were established. Incidentally we may note that many years ago a similar observation was made in connexion with the pollution of the river Severn in England. Micro-organisms from town drainage found their eventual resting place in the vegetation of the river banks many miles down stream, and anthrax from tanneries in this way infected the cattle grazing on the river pastures. The problem, therefore, is how hides can be effectively disinfected before they are handled for tanning. Dr. Leymann tested three processes: the Seymour-Jones, which consists in dipping the hides for twenty-four hours in a solution of 0.02 per cent. of mercury chloride and 0.9 per cent. of formic acid; the pickling process of treating them with a solution of 1 to 2 per cent. of hydrochloric acid to which 10 per cent. of common salt has been added, and kept at a temperature of 20° to 40° C.; and the lye process, the basis of which is a 0.5 per cent. soda lye with 1 to 10 parts in 100 of common salt added. Dr. Leymann's conclusions are that the Seymour-Jones process is uncertain, that the pickling process gives good results, and is eminently suitable for disinfection at ports of entry and at industrial centres where there are special establishments, and that the lye process, which also gives good results, is simpler and more economical and consequently offers considerable advantages to smaller establishments. Detailed instructions for disinfection of hides by both these latter processes are given as appendices to the report, and the pamphlet thus contains matter that is of great importance not only to the tannery industry, but also to medical officers of health. Further practical measures of dealing with imported hides will depend on the drawing up of a list of countries in which anthrax is prevalent, and this is being considered by the Advisory Committee. The general subject is being discussed at a meeting this week of the international committee of experts appointed at the Labour Conference of Washington in 1919, to deal with matters affecting the health of workers. The committee is composed of medical inspectors of factories and others possessing technical and scientific knowledge of industrial hygiene, drawn from a dozen countries; among the representatives of this country is Dr. T. M. Legge, chief medical inspector of factories. Another subject to be discussed at the meeting this week is the preparation of a schedule of unhealthy processes. This involves not merely the examination of the dangers to health involved in various processes, but the collection and study of all the available scientific and statistical information relating to each process. The list is already in an advanced stage, but before it is published the experts forming the present committee are to be asked to examine it in detail and to collaborate in ensuring its scientific completeness and accuracy.

[1] *Anthrax in the Tanning Industry.* By Dr. H. Leymann. Studies and Reports, Series F (Industrial Hygiene and Accidents), No. 7. International Labour Office, Geneva. August, 1923. (Pp. 30. 1s.)

THE SAVILE CLUB.

LAST year the Savile Club completed forty years of residence in 107, Piccadilly, a house bought from Lord Rosebery in 1882, although its existence under the name of the Savile dates from some ten years earlier. To celebrate the club's jubilee a history of its origin and development,[1] with a list of all who have been or are its members, and entertaining reminiscences of many of them, has been prepared, evidently by a loving hand, for it is a club beloved of its habitués. The handsome volume contains much that is of interest to medical men. It was the "Medical Club" to which the Savile may be said to owe its origin. In 1868 the Medical Club offered the Eclectic Club—incidentally both these clubs are defunct or have been submerged in other names—"a very pleasant and complete set of rooms" at 9, Spring Gardens, overlooking Trafalgar Square. The Eclectic, a night club but not of the modern variety, declined the offer, but some of its members thought better of it and took over the delectable premises with a view to forming a club "of such persons as are engaged in different ways of life, and deputed as it were out of the most conspicuous classes of mankind." The quotation, which is from the *Spectator* of April 9th, 1711, is given in a short preface to the history as indicating the dominant principle on which the Savile Club was founded—namely, the mixture of men of different professions and opinions, and a careful process of election. The list of members bears this out to a remarkable degree, for it contains the names of men who have become famous as statesmen, authors, editors, artists, composers, bishops, doctors, scientists, soldiers, and explorers. There is an imposing array of Fellows of the Royal Society. It has been said elsewhere that the Club was "a little place" for those aspiring to the dignity of membership of a certain club, reputed to be duller and more austere, to wait in. It has become a little place for them to return to for relaxation and conviviality. In 1871 the new club moved from Spring Gardens to 15, Savile Row, and took its present name then. It outgrew the premises in 1881

[1] *The Savile Club, 1868-1923.* Privately printed for the Committee of the Club. 1923. (Pp. 205.)

and went to 107, Piccadilly the following year. From its earliest days many prominent members of the medical profession have belonged to it. Andrew Clark was the largest subscriber amongst the original guarantors. Ernest Hart figures amongst such historic names of original members as Thomas Hughes of *Tom Brown's Schooldays* fame, Henry Sidgwick, Sir W. Anson, James Bryce, Sir Samuel Baker, Earl Brassey, Lord Dufferin, the Marquess of Lorne, Stafford Northcote, and several others well known in the scholastic, literary, and political worlds. Drs. Bastian and Pye-Smith and Sir Michael Foster were also original members; they served on the earlier committees, as did subsequently Dr. Corfield, Sir Bryan Donkin, and Sir Lauder Brunton, and in later years Sir George Makins, Sir Seymour Sharkey, Sir Isambard Owen, Sir Arthur Whitelegge, Sir Squire Sprigge, Sir David Prain, and other prominent members of the medical profession. The reminiscences, as revealed by the historian, tell us little or nothing about their individual characters as members of the Club, but, judging by the company they kept, their conversation must have been on a high level of learning, brilliancy, wit, and entertainment. The Savile was a happy family, where none were strangers to one another. Simplicity in all arrangements and the maintenance of a table d'hôte, at which members partook of the same meal at the same table in order to preserve mutual acquaintance and friendship, was and is the guiding principle, well expressed in the Club's motto, "Sodalitas Convivium." "By this means," as a member once said, again quoting the *Spectator* of April 9th, 1711, "I am furnished with the greatest variety of hints and materials, and know everything that passes in the different quarters and divisions, not only of this great city, but of the whole kingdom," and he added "of the whole world."

WEST AFRICAN CONGRESS OF TROPICAL MEDICINE.

THE first Congress of Tropical Medicine in West Africa was held from July 16th to 23rd, 1923, at Loanda, by the invitation of the Government of Angola. Those who know West Africa, and the difficulties of finding accommodation for 120 guests in one town, will appreciate the magnitude of the test put upon Portuguese hospitality. But the hosts rose splendidly to the occasion. Each delegate realized that he was not only a welcome but an exceptionally favoured guest, and this hospitality was extended also to wives and children of the "congressistas." The object of the congress was to discuss the ways and means of attacking the medical and sanitary problems, more particularly with regard to the native inhabitants, of the colonies represented. The first session was devoted to sanitary organization; the following five were given over to practical methods in the prophylaxis and treatment of the prevalent diseases; and at the remaining sessions communications were read on the results of scientific research. At the opening meeting the municipal council formally offered its welcome and its magnificent chambers, and at a later stage the High Commissioner of the Republic in Angola—General José Mendes Ribeiro Norton de Matos—officially, and in his capacity of honorary president of the congress, opened the proceedings. Eighty-three communications were read and discussed, main interest being centred on sleeping sickness, tuberculosis, leprosy, schistosomiasis, and malaria. Other subjects included blood and intestinal protozoa, pathogenic fungi, climatology, and anthropology. Seventy-six delegates attended the meetings, representative of Angola, Portugal, Belgian Congo, San Tomé, Cameroun, French West Africa, French Equatorial Africa, Portuguese India, Mozambique, Paris, the Union of South Africa, and Nigeria, and the London School of Tropical Medicine. At the final meeting resolutions dealing with intercolonial public health reports, sleeping sickness, tuberculosis, and other diseases were passed. A full report of the proceedings will shortly be published by the executive committee, under the chairmanship of Dr. Damos Mora. Two prizes of 10,000 francs each were offered, one for the paper on the best practical methods of hospital treatment of the native, and the other for the most outstanding work in the proceedings of the congress. The social side of the congress was a series of official receptions, dinners, luncheons, dances, and garden parties. Fireworks, illuminated displays at night, a cinematograph entertainment, an excursion into the interior at Humabo, a hunting expedition at Mossamedes, and visits to local factories and places of interest, including hospitals, contributed to make the delegates' life a very crowded one, and full of interest. Not only at Loanda was entertainment provided, but also at Novo Redondo, Lobito, Benguela, and Mossamedes, and two enjoyable days were spent at the beautiful island of San Tomé. The next congress is fixed for the year 1927 at Dakar.

MAUDSLEY HOSPITAL COURSES.

THE second part of the sixth course of lectures and demonstrations for the Diploma in Psychological Medicine will open at the Maudsley Hospital on October 8th. Dr. Edward Mapother will deliver eight lectures on morbid psychology, on Mondays at 2.30 and 4.30 p.m., beginning on October 8th. Dr. Bernard Hart will give eight lectures on the psychoneuroses on Mondays at 3.30 and 5.30 p.m., beginning on November 5th. Sir Frederick Mott will give six lectures on the pathology of mental diseases, including brain syphilis, its symptomatology and treatment, on Tuesdays at 4.30 p.m., beginning on November 6th. Dr. C. Hubert Bond will give eight lectures on the legal relationships of insanity and treatment on Tuesdays, October 9th, 16th, and 23rd, at 4.30 p.m., and on Thursdays, October 11th and 25th, at 4.30 p.m. Dr. F. C. Shrubsall will give eight lectures on the practical aspect of mental deficiency on Wednesdays at 2.30 p.m., beginning on October 10th, and on Tuesdays at the same hour, beginning on November 6th. Dr. W. C. Sullivan, medical superintendent, Broadmoor Asylum, will give six lectures on crime and insanity on Wednesdays at 4.30 p.m., beginning on October 10th, and on Thursdays at the same hour, beginning on November 8th. Dr. Mapother will give six lectures in clinical psychiatry on Wednesdays at 2.30 p.m., beginning on November 7th. Sir Frederick Mott and Dr. F. L. Golla will give twelve clinical demonstrations in neurology on Thursdays at 2.30 p.m., beginning on October 11th; the first six demonstrations will be given by the former at Camberwell Infirmary, and the second six by the latter at the Hospital for Paralysis and Epilepsy, Maida Vale, on Thursdays at 2.30 p.m., beginning on November 22nd. The fee for the whole of Part II of the course is ten guineas; for a single series of lectures, two guineas. The Fellowship of Medicine (1, Wimpole Street, W.1) will collect fees from, and issue tickets to, medical men intending to take the course who are introduced by the Fellowship. All inquiries regarding lectures, etc., should be addressed to the Director of the Pathological Laboratory, Maudsley Hospital, Denmark Hill, S.E.5.

THE Canadian Medical Association is arranging for a Lister Oration to be given once every three years. The first of these will be given next year at the annual meeting in Ottawa by Dr. John Stewart of Halifax. Dr. Stewart was one of Lister's house-surgeons in the early days in Edinburgh.

DR. ANDREW BALFOUR, C.B., C.M.G., who for the past ten years has been Director-in-Chief of the Wellcome Bureau of Scientific Research, London, will resign that position on October 31st. His successor is Dr. C. M. Wenyon, C.M.G., C.B.E.

THE BRITISH ASSOCIATION, LIVERPOOL.

PRESIDENT'S ADDRESS
ON
THE ELECTRICAL STRUCTURE OF MATTER.

THE annual meeting of the British Association for the Advancement of Science opened in Liverpool on Wednesday, September 12th, when Sir Ernest Rutherford succeeded Sir Charles Sherrington as President.

INTRODUCTORY.

Sir ERNEST RUTHERFORD began his presidential address by recalling that when the British Association last visited Liverpool, in 1896, it met under the presidency of the late Lord Lister, whose memory is held in affectionate remembrance by all nations. His address, which dealt mainly with the history of the application of antiseptic methods to surgery and its connexion with the work of Pasteur, that prince of experimenters, whose birth has been so fittingly celebrated this year, gave in a sense a completed page of brilliant scientific history. At the same time, in his opening remarks, Lister emphasized the importance of the discovery by Röntgen of a new type of radiation, the x rays, which, as is now realized, marked the beginning of a new and fruitful era in another branch of science. The discovery had been published to the world in 1895, while the discovery of the radio-activity of uranium by Becquerel was announced early in 1896. Even the most imaginative of scientific men could never have dreamed at that time of the extension of our knowledge of the structure of matter that was to develop from these two fundamental discoveries; but in the records of the Liverpool meeting were to be seen the dawning of a recognition of the possible consequences of the discovery of x rays, not only in their application to medicine and surgery, but as a new and powerful agent for attacking some of the fundamental problems of physics.

In applied physics, too, 1896 marked the beginning of another advance. In the discussion of a paper which I, Sir Ernest Rutherford said, had the honour to read, on a new magnetic detector of electrical waves, the late Sir William Preece told the meeting of the successful transmission of signals for a few hundred yards by electric waves which had been made in England by a young Italian, G. Marconi. The first public demonstration of signalling for short distances by electric waves had been given by Sir Oliver Lodge at the Oxford meeting of this Association in 1894. It is startling to recall the rapidity of the development from such small beginnings of the new method of wireless intercommunication over the greatest terrestrial distances. In the last few years this has been followed by the even more rapid growth of the allied subject of radiotelephony as a practical means of broadcasting speech and music to distances only limited by the power of the transmitting station.

The rapidity of these technical advances is an illustration of the close interconnexion that must exist between pure and applied science if rapid and sure progress is to be made. The electrical engineer has been able to base his technical developments on the solid foundation of Maxwell's electromagnetic theory and its complete verification by the researches of Hertz, and also by the experiments of Sir Oliver Lodge in this university. The benefits of this union of pure and applied research have not been one-sided. If the fundamental researches of the workers in pure science supply the foundations on which the applications are surely built, the successful practical application in turn quickens and extends the interest of the investigator in the fundamental problem, while the development of new methods and appliances required for technical purposes often provides the investigator with means of attacking still more difficult questions.

This important reaction between pure and applied science is particularly manifest in the development of x-ray radiography for therapeutic and industrial purposes, where the development on a large scale of special x-ray tubes and improved methods of excitation has given the physicist much more efficient tools to carry out his researches on the nature of the rays themselves and on the structure of the atom. In this age no one can draw any sharp line of distinction between the importance of so-called pure and applied research. Both are equally essential to progress, and we cannot but recognize that without flourishing schools of research on fundamental matters in our universities and scientific institutions technical research must tend to wither. Fortunately there is little need to labour this point, for the importance of a training in pure research has been generally recognized. Those who have the responsibility of administering the grants in aid of research for both pure and applied science will need all their wisdom and experience to make a wise allocation of funds to secure the maximum of results for the minimum of expenditure. It is fatally easy to spend much money in a direct frontal attack on some technical problem of importance when the solution may depend on some addition to knowledge which can be gained in some other field of scientific inquiry, possibly at a trifling cost. It is not in any sense my purpose to criticize those bodies which administer funds for fostering pure and applied research, but to emphasize how difficult it is to strike the correct balance between the expenditure on pure and applied science in order to achieve the best results in the long run.

THE ELECTRICAL STRUCTURE OF MATTER.

Sir Ernest Rutherford then entered upon the main topic of his address, the great advance in knowledge of the nature of electricity and matter which justified the description of the period since the last Liverpool meeting as the heroic age of physical science.

Before the beginning of that period, he said, it had been perceived by the more philosophically minded that the periodic variations of the properties of the elements brought out by Mendeléef were only explicable if atoms were similar structures in some way constructed of similar material. At the same time the idea was generally gaining ground that an explanation of the results of Faraday's experiments on electrolysis was only possible on the assumption that electricity, like matter, was atomic in nature. The name "electron" had been given to this fundamental unit by Johnstone Stoney, and its magnitude roughly estimated, but the full recognition of the significance and importance of this conception belongs to the new epoch. In the early development of this subject science owes much to the work of Sir J. J. Thomson, both for the boldness of his ideas and for his ingenuity in developing methods for estimating the number of electrons in the atom, and of probing its structure. He early took the view that the atom must be an electrical structure, held together by electrical forces, and showed in a general way lines of possible explanation of the variation of physical and chemical properties of the elements, exemplified in the periodic law. The discovery of radium was a great step in advance, for it provided the experimenter with powerful sources of radiation specially suitable for examining the nature of the characteristic radiations which are emitted by the radio-active bodies in general. It was soon shown that the atoms of radio-active matter were undergoing spontaneous transformation, and that the characteristic radiations emitted—namely the α, β, and γ rays—were an accompaniment and consequence of these atomic explosions. The proof that the α particle is a charged helium atom for the first time disclosed the importance of helium as one of the units in the structure of the radio-active atoms, and probably also in that of the atoms of most of the ordinary elements.

Not only, then, have the radio-active elements had the greatest direct influence on natural philosophy, but in subsidiary ways they have provided us with experimental methods of almost equal importance. The use of α particles as projectiles with which to explore the interior of the atom has definitely exhibited its nuclear structure, has led to artificial disintegration of certain light atoms, and promises to yield more information yet as to the actual structure of the nucleus itself.

The Electron and the Proton.

We know that the electron has a negative charge of one fundamental unit, while the charged hydrogen atom, whether in electrolysis or in the electric discharge, has a charge of one positive unit. But the mass of the electron is only 1/1840 of the mass of the hydrogen atom; no evidence has been found of the existence of a positive electron of small mass like the negative. In no case has a positive charge been found associated with a mass less than that of a charged atom of hydrogen. The small mass of the negative electron is to be associated with the energy of its electrical structure, so that the electron may be regarded as a disembodied atom of negative electricity. The hydrogen atom is the lightest of all atoms, and is presumably the simplest in structure, and the charged hydrogen atom, which is to be regarded as the hydrogen nucleus, carries a unit positive charge. It is thus natural to suppose that the hydrogen nucleus is the atom of positive electricity, or positive electron, analogous to the negative electron, but differing from it in mass. There is the strongest evidence that the atoms of matter are built up of these two electrical units—namely, the electron and the hydrogen nucleus or proton, as it is usually called when it forms part of the structure of any atom. It is probable that these two are the fundamental and indivisible units which build up our universe.

The Nuclear Atom.

Professor Rutherford described the conception of the nuclear atom according to which the heart of the atom consists of a minute but massive nucleus, carrying a positive charge of electricity and surrounded at a distance by the requisite number of electrons to form a neutral atom. In a heavy atom like that of gold the radius of the nucleus, if supposed to be spherical, is less than one-thousandth of the radius of the complete atom surrounded by its electrons. These outer electrons are in some way held in equilibrium by the attractive forces of the nucleus, and their arrangement and motion must be governed entirely by the magnitude of the nuclear charge. Since the ordinary chemical and physical properties are to be ascribed mainly to the configuration and motion of the outer electrons, it follows that the properties of an atom are defined by a whole number representing its nuclear charge.

Moseley's Law and Bohr's Theory.

Professor Rutherford went on to explain Moseley's law, which fixed the number of electrons in all the atoms, and showed that the properties of an atom are determined not by its atomic weight but by its nuclear charge. He dealt briefly with the quantum theory, and sketched the method by which Bohr has sought to determine the distribution of the electrons around the nucleus of any atom and to fix the quantum numbers that characterize the motion of each electron, and to form a rough idea of the character of the orbit.

The first element, hydrogen, he continued, has a nuclear charge of 1 and 1 electron; the second, helium, has a charge 2 and 2 electrons, moving in coupled orbits. These two electrons form a definite group, known as the K group, which is common to all the elements except hydrogen. For increasing nuclear charge the K group of electrons retain their characteristics, but move with increasing speed, and approach closer to the nucleus. As we pass from helium of atomic number 2 to neon, number 10, a new group of electrons is added consisting of two subgroups, each of four electrons, together called the L group. This L group appears in all atoms of higher atomic number, and, as in the case of the K group, the speed of motion of the electrons increases, and the size of their orbits diminishes with the atomic number. When once the L group has been completed a new and still more complicated M group of electrons begins forming outside it, and a similar process goes on until uranium, which has the highest atomic number, is reached.

A Vizualization of the Planetary System of the Atom.

It may be of interest to try to visualize the conception of the atom we have so far reached by taking for illustration the heaviest atom, uranium. At the centre of the atom is a minute nucleus surrounded by a swirling group of 92 electrons, all in motion in definite orbits, and occupying but by no means filling a volume very large compared with that of the nucleus. Some of the electrons describe nearly circular orbits round the nucleus; others, orbits of a more elliptical shape whose axes rotate rapidly round the nucleus. The motion of the electrons in the different groups is not necessarily confined to a definite region of the atom, but the electrons of one group may penetrate deeply into the region mainly occupied by another group, thus giving a type of interconnexion or coupling between the various groups. The maximum speed of an electron depends on the closeness of the approach to the nucleus, but the outermost electron will have a minimum speed of more than 1,000 kilometres a second, while the innermost K electrons have an average speed of more than 150,000 kilometres a second, or half the speed of light. When we visualize the extraordinary complexity of the electronic system we may be surprised that it has been possible to find any order in the apparent medley of motions.

Bohr's theory not only offers a general explanation of the optical and x-ray spectra of the atom, but it accounts in detail for many of the most characteristic features of the periodic law of Mendeléef. It gives us for the first time a clear idea of the reason for the appearance in the family of elements of groups of consecutive elements with similar chemical properties, such as the groups analogous to the iron group and the unique group of rare earths. The theory of Bohr, like all living theories, has not only correlated a multitude of isolated facts known about the atom, but has shown its power to predict new relations which can be verified by experiment. The power of Moseley's law to fix the atomic number of an element is well illustrated by the recent discovery by Coster and Hevesy in Copenhagen of the missing element of atomic number 72, which they have named "hafnium," and Bohr's theory rendered it possible to predict its chemical properties with great accuracy, and so gave the necessary incentive to search for it.

Chemical Combination.

So far no reference has been made to the very difficult question of the explanation on this theory of the chemical combination of atoms. In fact, as yet the theory has hardly concerned itself with molecular structure. On the chemical side, however, certain advances have already been made, notably by G. N. Lewis, Kossel, and Langmuir, in the interpretation of the chemical evidence by the idea of shared electrons, which play a part in the electronic structure of two combined atoms. There can be little doubt that the next decade will see an intensified attack by physicists and chemists on this very important but undoubtedly very complicated question.

The Nucleus of the Atom.

The nucleus of the atom is still a comparatively unexplored territory, though the study of radio-active bodies has provided us with very valuable information on the structure of the nucleus, for we know that the α and β particles must be expelled from it, and there is strong evidence that the very penetrating γ rays represent modes of vibration of the electrons contained in its structure. In the long series of transformations which occur in the uranium atom, eight α particles are emitted and six electrons, and it seems clear that the nucleus of a heavy atom is built up, in part at least, of helium nuclei and electrons. It is natural to suppose that many of the ordinary stable atoms are constituted in a similar way. It is a matter of remark that no indication has been obtained that the lightest nucleus—namely, that of hydrogen—is liberated in these transformations, where the processes occurring are of so fundamental a character. At the same time, it is evident that the hydrogen nucleus must be a unit in the structure of some atoms, and this has been confirmed by direct experiment. Dr. Chadwick and I have observed that swift hydrogen nuclei are released from the elements boron, nitrogen, fluorine, sodium, aluminium, and phosphorus when they are bombarded by swift α particles, and there is little room for doubt that these hydrogen nuclei form an essential part of the nuclear structure.

Professor Rutherford then gave a short account of the theory of "isotopes," which, he said, strongly supported

and extended the view that the nuclei of all atoms are built of protons of mass nearly 1 and of electrons. The nucleus of a heavy atom, he said, is undoubtedly a very complicated system, and in a sense a world of its own, little, if at all, influenced by the ordinary physical and chemical agencies at our command. When we consider the mass of a nucleus compared with its volume it seems certain that its density is many billions of times that of our heaviest element. Yet, if we could form a magnified picture of the nucleus, we should expect that it would show a discontinuous structure, occupied but not filled by the minute building units, the protons and electrons, in ceaseless rapid motion controlled by their mutual forces.

Energy Relations involved in the Formation and Disintegration of Atomic Nuclei.

For example, it is well known that the total evolution of energy during the complete disintegration of one gram of radium is many millions of times greater than in the complete combustion of an equal weight of coal. It is known that this energy is initially mostly emitted in the kinetic form of swift α and β particles, and the energy of motion of these bodies is ultimately converted into heat when they are stopped by matter. Since it is believed that the radio-active elements are analogous in structure to the ordinary inactive elements the idea naturally arose that the atoms of all the elements contained a similar concentration of energy, which would be available for use if only some simple method could be discovered of promoting and controlling their disintegration. This possibility of obtaining new and cheap sources of energy for practical purposes was naturally an alluring prospect to the lay and scientific man alike. It is quite true that, if we were able to hasten the radio-active processes in uranium and thorium so that the whole cycle of their disintegration could be confined to a few days instead of being spread over thousands of millions of years, these elements would provide very convenient sources of energy on a sufficient scale to be of considerable practical importance. Unfortunately, although many experiments have been tried, there is no evidence that the rate of disintegration of these elements can be altered in the slightest degree by the most powerful laboratory agencies. With increase in our knowledge of atomic structure there has been a gradual change of our point of view on this important question, and there is by no means the same certainty to-day as a decade ago that the atoms of an element contain hidden stores of energy.

It is possible by means of electron bombardment or by appropriate radiation to excite an atom in such a way that one of its superficial electrons is displaced from its ordinary stable position to another temporarily stable position further removed from the nucleus. This electron in course of time falls back into its old position, and its potential energy is converted into radiation in the process. There is some reason for believing that the electron has a definite average life in the displaced position, and that the chance of its return to its original position is governed by the laws of probability. In some respects an "excited" atom of this kind is thus analogous to a radio-active atom, but of course the energy released in the disintegration of a nucleus is of an entirely different order of magnitude from the energy released by return of the electron in the excited atom. It may be that the elements, uranium and thorium, represent the sole survivals in the earth to-day of types of elements that were common in the long distant ages, when the atoms now composing the earth were in course of formation. A fraction of the atoms of uranium and thorium formed at the time has survived over the long interval on account of their very slow rate of transformation. It is thus possible to regard these atoms as having not yet completed the cycle of changes which the ordinary atoms have long since passed through, and that the atoms are still in the "excited" state where the nuclear units have not yet arranged themselves in positions of ultimate equilibrium, but still have a surplus of energy which can only be released in the form of the characteristic radiation from active matter. On such a view, the presence of a store of energy ready for release is not a property of all atoms, but only of a special class of atoms like the radio-active atoms which have not yet reached the final state for equilibrium.

Calculation shows that the energy released in the formation of one pound of helium gas is equivalent to the energy emitted in the complete combustion of about eight thousand tons of pure carbon. It has been suggested that it is mainly to this source of energy that we must look to maintain the heat emission of the sun and hot stars over long periods of time. Calculations of the loss of heat from the sun show that this synthesis of helium need only take place slowly in order to maintain the present rate of radiation for periods of the order of one thousand million years. It must be acknowledged that these arguments are somewhat speculative in character, for no certain experimental evidence has yet been obtained that helium can be formed from hydrogen.

Possibilities of the Future.

In the short time at my disposal it has been impossible for me, even if I had the knowledge, to refer to the great advances made during the period under consideration in all branches of pure and applied science. I am well aware that in some departments the progress made may justly compare with that of my own subject. In these great additions to our knowledge of the structure of matter every civilized nation has taken an active part, but we may be justly proud that this country has made many fundamental contributions. With this country I must properly include our Dominions overseas, for they have not been behind-hand in their contributions to this new knowledge. It is, I am sure, a matter of pride to this country that the scientific men of our Dominions have been responsible for some of the most fundamental discoveries of this epoch, particularly in radio-activity.

This tide of advance was continuous from 1896, but there was an inevitable slackening during the war. It is a matter of good omen that, in the last few years, the old rate of progress has not only been maintained but even intensified, and there appears to be no obvious sign that this period of great advances has come to an end. There has never been a time when the enthusiasm of the scientific workers was greater, or when there was a more hopeful feeling that great advances were imminent.

The Scientific Imagination.

In watching the rapidity of this tide of advance in physics I have become more and more impressed by the power of the scientific method of extending our knowledge of Nature. Experiment, directed by the disciplined imagination either of an individual, or better still, of a group of individuals of varied mental outlook, is able to achieve results which far transcend the imagination alone of the greatest natural philosopher. Experiment without imagination, or imagination without recourse to experiment, can accomplish little, but, for effective progress, a happy blend of these two powers is necessary. The unknown appears as a dense mist before the eyes of men. In penetrating this obscurity we cannot invoke the aid of supermen, but must depend on the combined efforts of a number of adequately trained ordinary men of scientific imagination. Each in his own special field of inquiry is enabled by the scientific method to penetrate a short distance, and his work reacts upon and influences the whole body of other workers. From time to time there arises an illuminating conception, based on accumulated knowledge, which lights up a large region and shows the connexion between these individual efforts, so that a general advance follows. The attack begins anew on a wider front, and often with improved technical weapons.

Conditions Necessary for Progress.

The intellectual interest due to the rapid growth of science to-day cannot fail to act as a stimulus to young men to join in scientific investigation. In every branch of science there are numerous problems of fundamental interest and importance which await solution. We may confidently predict an accelerated rate of progress of scientific discovery, beneficial to mankind certainly in a material but possibly even more so in an intellectual sense.

In order to obtain the best results certain conditions must, however, be fulfilled. It is necessary that our universities and other specific institutions should be liberally supported, so as not only to be in a position to train adequately young investigators of promise, but also to serve themselves as active centres of research. At the same time there must be a reasonable competence for those who have shown a capacity for original investigation. Not least, peace throughout the civilized world is as important for rapid scientific development as for general commercial prosperity. Indeed, science is truly international, and for progress in many directions the co-operation of nations is as essential as the co-operation of individuals. Science, no less than industry, desires a stability not yet acheived in world conditions.

There is an error far too prevalent to-day that science progresses by the demolition of former well established theories. Such is very rarely the case. For example, it is often stated that Einstein's general theory of relativity has overthrown the work of Newton on gravitation. No statement could be farther from the truth. Their works, in fact, are hardly comparable, for they deal with different fields of thought. So far as the work of Einstein is relevant to that of Newton, it is simply a generalization and broadening of its basis; in fact, a typical case of mathematical and physical development. In general, a great principle is not discarded but so modified that it rests on a broader and more stable basis.

It is clear that the splendid period of scientific activity which we have reviewed to-night owes much of its success and intellectual appeal to the labours of those great men in the past, who wisely laid the sure foundations on which the scientific worker builds to-day, or to quote from the words inscribed in the dome of the National Gallery, "The works of those who have stood the test of ages have a claim to that respect and veneration to which no modern can pretend."

EXHIBITION.

Following the example of the British Medical Association and some other associations which hold annual meetings, the British Association has this year, for the first time, arranged an exhibition of scientific appliances, illustrating the apparatus used in research laboratories and in the industrial application of scientific investigations. It is displayed in the Central Technical School.

The exhibition was opened by Sir Charles Sherrington, President of the Royal Society and retiring President of the British Association, on the afternoon of September 10th. In a short address he said that instruments used in the service of natural science were becoming inevitably far more complex. The connexion between the tool and the man was so close that it was difficult at times to unravel the share the scientific tool had in the process. Though discovery was not synonymous with invention the connexion between the two was very close. The proverb said that necessity was the mother of invention, but it might be truer that curiosity was the mother of invention, for apparatus had come into existence to satisfy what might be called the divine curiosity of man, who was not satisfied with understanding only the appearances of things. Invention was sometimes belittled in comparison with discovery, but invention was the potential birth of discovery. The intellect saw the principle and rough-hewed the design.

The exhibition was then inspected. Special interest was shown in the demonstration by Dr. A. O. Rankine, professor of physics in the Imperial College of Science, South Kensington, of an instrument by which sounds of any kind, including spoken words, are transmitted by light. A beam of light is sent through space by a special transmitter, and the fluctuations of the beam are reproduced as sound at the receiving station. In the demonstration at Liverpool the space covered was about 200 yards, but as long a distance as a mile and a half has been traversed. The distance appears to be limited only by the curvature of the earth, and Professor Rankine suggested that there were great possibilities for the invention, especially in synchronizing speech with the picture in cinematography.

INDIGENOUS SYSTEMS OF MEDICINE IN INDIA.

AYURVEDA, SIDDHA, UNANI.

ON February 21st, 1921, the Madras Legislative Council passed a resolution recommending the Government to take early steps to encourage the indigenous systems of medicine. Under G.O. No. 1351, P.H., Press, dated October 17th, 1921, the Government appointed a committee to report on the question of the recognition and encouragement of indigenous systems of medicine in vogue in the Presidency. The object of the Government in ordering the inquiry was to afford the exponents of the Ayurvedic and Unani systems an opportunity to state their case fully for scientific criticism, and to justify State encouragement of these systems. With this end in view a questionary was prepared and sent round to all persons interested in this matter. No less than 182 replies were received from all parts of India, including Indian States. Further, forty representative witnesses were orally examined in Madras, and a special subcommittee visited important centres of the indigenous systems of medicine and conferred with the leading exponents of these systems and other persons interested in their promotion. On February 17th, 1923, the committee presented its report, consisting of 150 pages, of which nearly one hundred are devoted to a description of the indigenous systems. Much of the remaining portion of the report has reference to such practical matters as registration, the organization of medical education, and finance; questions of this nature appear to be outside the scope of the inquiry and need no comment.

Statistics.

For a population of more than 42,300,000 inhabiting the Madras Presidency, the total number of practitioners following the European system is not more than 3,000; the number following the Indian systems is reckoned at 21,000 by the committee and at about 4,000 by the local authorities. Commenting on the discrepancy between the last two figures the committee states that "apparently the standard of our local authorities in judging our Ayurvedic and Unani practitioners is very high, otherwise we would not have '*nil* returns' sent to us in large numbers; for it is the general belief that there is hardly a village, especially in the south, without its own vydiars or hakims. These, however, do not apparently count in the judgement of our local authorities." The point is one of importance because the main object of the inquiry was to ascertain the value of the Indian systems as seen in present-day practice, and not merely in its historical aspect which figures so largely in the report. If four-fifths of the native practitioners are considered to fall below a certain undefined standard, it is desirable to know what degree of medical erudition they possess. If it is true that Ayurveda has practically died out among them there would appear to be no reason, except, perhaps, a sentimental one, why the modern European system should not be introduced in place of the ancient one, if it is superior to the latter. The report furnishes very little information in this connexion, but scattered references lend support to the view that the local authorities were not actuated entirely by prejudice. Thus:

"It would be self-deception on our part to think that we still sit on a high pedestal. The fact is unfortunately the other way. The number of Ayurvedic physicians in India is legion, but the soundly educated exponents of the ancient systems are not numerous."

"Our old methods of study might have been of a high order, but we must not be timorous to admit that the present methods by which so-called Kavurajas are manufactured of idle pupils or compounders in many cases, are fit to be mercilessly condemned."

"As practised at present the Indian systems are not self-sufficient."

It will, therefore, probably not be incorrect to assume that the indigenous systems have so far decayed as, generally speaking, to be non-existent, except in a few educational centres.

"Can it be denied that the art has at present decayed to such an extent that it is not equal to the task of ministering to the surgical needs of our teeming millions?"

"Even assuming for a moment that such branches of Indian medicine as surgery and midwifery were not merely the forgotten arts that they are now . . ."

On the other hand, there is good evidence that the native practitioners perform a useful service in the villages, more especially on the medical side of practice and in the treatment of ordinary diseases, although in the absence of adequate scientific training they must often have the character of "medicine men."

The Demands of the Indigenous Practitioners.

From these considerations it would seem that the ground is clear either for the introduction of the European system or the resuscitation of the indigenous system, whichever may be deemed preferable. Doubtless there exists among the more educated Ayurvedists a natural and praiseworthy desire to retain their national systems, and it is, moreover, probable that European scientists are inclined to ignore the force of the religious element. That there is a strong religious feeling intermingled with the purely practical part of the question can hardly be doubted, and it becomes evident in such statements as the following:

"Every system of Hindu thought is at once philosophy, science and religion, all in one and one in all."

"Ayurveda will never consent to lose its characteristic of thinking in terms of its own peculiar religious philosophy of Satwa, Rajas and Tamas."

To wound this feeling and unnecessarily run counter to it is undesirable and would be bad policy, and for this reason alone the Government would be well advised to give such temporary support to the systems as will prevent their entire decay and enable them to continue their present services, in face of the impossibility of immediately replacing them by anything better.

The demand of the Ayurvedists is that their system shall be resuscitated and recognized by the States as constituting a sound basis of medical education and practice. The demand can be fairly considered only by those who possess a competent knowledge of Ayurveda, and the report purports to furnish the means of acquiring this knowledge. It is, however, stated that much misunderstanding and unfair criticism have resulted in the past through the mistranslation of scientific terms by European writers on the subject of Ayurveda. The following account is, therefore, based solely on the information contained in the report, and is an attempt at an unbiased interpretation.

It will be admitted on all hands that Ayurveda was a great science in its day; but it does not follow, as the report, in dealing with the Unani system, seems to imply, that what was useful centuries ago is necessarily profitably retained at the present time. It is asked:

"Can Europe forget the time when European students derived instruction in their medical colleges for centuries together from the self-same Unani books which they were then hugging to their bosoms and which in Arabic find a place to-day in the syllabus of our medical colleges? . . . All evidence points to the allopathic system being the transformed Unani system. Can any sensible man, in the circumstances, declare the Unani system to be crude and unscientific?"

The reply is that it may well be so according to modern standards. The three systems—Ayurveda, Siddha, and Unani—have much in common and, so far as description is concerned, what is stated with regard to Ayurveda, the most important of the three, may be held to apply to the other two.

General Principles of Ayurveda.

Ayurveda means, literally, the science of Ayus, a name denoting the momentum of vital activities, upon which the duration of life, or the expectation of life, depends. The Ayus varies in different individuals according to their inherited constitution, and is modified by internal and environmental conditions. On its practical side Ayurveda lays down rules for adjusting our circumstances to our constitutions, in order that our Ayus may suffer no diminution and life may have its normal duration.

Behind material things there exists an All-Intelligence, Soul or Spirit (Purushu), from which all matter emanates and which constitutes the generating force of every phenomenal activity. Everything in Nature, including mind, is matter—the emanation or "expression" or "function" of the spirit. But matter is not to be conceived of in the abstract as dead, but always as endowed with various potential activities, such as vibrational energy, taste-energy, smell-energy; and it is of two kinds, Bhuta and Guna, differing in the character of their inherent energies. Bhuta-matter is endowed with energies that reveal themselves in the several physical states, and it exists in five forms—Prithvi (solid), Ap (liquid), Vayu (gas), Thejas (radiant matter), and Akash (ether). Guna-matter appears to be a more direct emanation of Spirit (Purushu), and is, in fact, the substance into which primal matter differentiated itself when the universe first came into manifestation. It exists in three forms—Rajas, Satwa, and Tamas—corresponding to the Trinity of the Spirit, and it imparts this threefold nature, as a fundamental characteristic, to every manifested existence in the phenomenal universe. Combined with and operating upon Bhuta-matter it constitutes the living body, which is itself permeated with the Soul, forming the living being. All things are thus constituted; all are living beings, and the distinction between animate and inanimate objects does not exist; but inasmuch as the Soul is independent, absolute, and uninfluenced by the activities of the body, it may be disregarded in the study of bodily processes. Although the constitution of all things is identical, the degree of organization—the position in the evolutionary scale—varies, the mode in which Gunas and Bhutas react and interact on one another giving to each being its particular individuality, Ego, or Jiva, the human Jiva being that Guna-Bhuta combination which is peculiar to man.

The specific energies residing in Bhuta-matter tend, as before stated, to the manifestation of physical states (liquid, solid), and although they may, presumably, modify one another when acting in combination, the correlation of energies is not their function. On the other hand, correlation may be considered as the characteristic function of the three Gunas. When they are in equilibrium there is no revelation; when the equilibrium is disturbed the manifest universe appears, and all things result from their peculiar arrangement and combination. In general terms the energy of Rajas may be said to be creative or dynamic; that of Satwa, sustentative or transformative; that of Tamas, conserving or static.

When acting on Bhuta-matter the threefold influence, before referred to, of the Gunas becomes evident, and three substances result—Vata, Pittha, and Kapha—representing the primal constituents of the living body. The relation of these three substances to the several forms of Guna- and Bhuta-matter is that Vata contains Akash (ether) and Vahu (gas), and is under the predominant influence of Rajas; Pittha contains Thejas (radiant matter), and is under the predominant influence of Satwa; and Kapha contains Ap (liquid) and Prithvi (solid), and is under the predominant influence of Tamas.

Ayurvedic Conceptions of Metabolism.

From the foregoing details regarding the energies inherent in the various forms of matter it is possible to deduce the physiological relations of the three substances or Dhatus, as they are called. Vata is concerned with those physical and mental processes which are creative or dynamic in nature; hence its presence is to be inferred in such mental phenomena as enthusiasm, concentration, etc., and in such physical phenomena as respiration, circulation, voluntary action, excretion, and in the activities of the nervous system as a whole. Pittha is concerned with sustentative or transformative processes; hence its presence is to be inferred in such mental phenomena as intellection and clear conception, and in such physical phenomena as digestion, assimilation, lieat production, the activities of the nutritional system as a whole, secretory activities of all kinds, and metabolism generally. Kapha is concerned with processes that are conserving or static in nature; hence its presence is to be inferred in such mental phenomena as courage, forbearance, etc., and in such physical phenomena as promotion of bodily strength, the integration of the structural elements of the body into stable structures, the smooth working of joints, and the activities of the skeletal system as a whole. It is also concerned in thermo-regulation, the tissues being liable to be consumed by the "internal fires of Pittha" unless protected by the "waters of Kapha."

The changes undergone by food in the body may be mentioned in illustration of the Ayurvedic conception of metabolism. The food is projected down the gullet and into the stomach and intestines by Vata, and is there acted on by Pittha in the menstruum of Kapha and converted into chyle. In a similar way, by the repeated action of Vata, Pittha, and Kapha, chyle is converted into blood, blood into muscle, muscle into fat, fat into bone, bone into marrow, and marrow into the reproductive elements.

Ayurvedic Pathology.

Such is the physiology of Ayurveda. Its pathology is no less singular, and is built on the foundation of the Thri-Dhatu theory of Vata, Pittha, and Kapha above outlined. Persons are broadly marked off into three classes characterized by the predominance of one or other Dhatu in their constitutions, and infinite minor variations in the Thri-Dhatu equilibrium are possible, all of which are classifiable under the three primary groups of Vata-, Pittha-, and Kapha-temperaments. In Ayurveda it is considered to be of vital importance to know the temperament or Prakriti of a person, since his life-activities, both in health and disease, have to be judged and adjusted with reference to his own particular type of inherited Dhatu-constitution. Considering the importance of the subject it is to be regretted that the method of diagnosing the Prakriti or temperament is not mentioned, it being merely stated that the characteristic features of each group are set down at length in works on Ayurveda.

As long as the three Dhatus are in normal equilibrium the body is in health; when the equilibrium is disturbed, the body is ill, the Dhatus being then spoken of as Doshas, because they are the cause of "faults" in the body health.

"From the clinical experience of ages recorded in our books and added to from time to time by various acute observers, we are able to diagnose the exact nature of the doshic disturbance, whether it is essentially a morbidity of one, two, or three Doshas, whether it indicates their increase, and so on. The teachings of our Rishis also help us in diagnosing which of the Dhatus is primarily at fault. Once a knowledge of the morbid Doshas and Dhatus is gained the rest is easy."

It will be noticed from the above that disease is conceived of as a disturbance of the normal equilibrium of the vital activities; it is regarded from the standpoint of the physiological norm, rather than as a series of body changes resulting from the action of an external cause. The latter point of view is by no means lacking in Ayurveda, but the former receives an exaggerated emphasis and may be regarded as the principal characteristic of Ayurvedic doctrine. So strongly is the view held that doshic disturbance constitutes the very essence of disease, that a lesion produced by injury, poisons, micro-organisms, etc., is not regarded as a disease unless or until doshic derangement becomes manifest. But even in its conception of etiology the subjective point of view is strongly marked. Among the recognized external causes of disease are included the "incompatible correlation of the senses with their object." This is explained as follows:

"Physical objects cannot make for health or ill health without coming into relationship with our bodies, and this can only occur through the five senses. With regard to the sense of taste, for instance, there may be excessive, defective, or perverted correlation by tasting (that is, eating or drinking) too much, too little, or unsuitable articles."

Among external causes acting, as it were, from within are such as lead to faulty understanding and so to abnormality of Dhatu-balance. Intrinsic causes are held to be of two kinds: abnormality in the Dhatu-equilibrium and abnormality in the Guna-equilibrium. Among the latter are included the mental Doshas, such as cupidity, anger, jealousy, indolence, etc., which may become the causative factors in disease.

Ayurvedic Diagnostic Methods.

The general methods of diagnosis pursued by Ayurvedists are more or less similar to those used by European doctors and are classified under the six headings of Auscultation, Palpation, Inspection, Smell, Taste, and Interrogation. With what degree of precision these methods are conducted by the native practitioners, and what is the nature of the information they afford, is not readily deducible from the report. "The main difference," it is stated, "between the two systems (Western and Indian) is accounted for by the use of the newly invented instruments. To ascertain the temperature of the body . . . we feel the patient's pulse, whereas the allopaths have recourse to the thermometer for the same purpose." That the clinical examination by means of these apparently European methods is not precisely similar to our own is shown in the following quotation:

"Next only in importance to the Nadies is the examination of the urine, in which they have discovered five tests—namely, colour, density, smell, froth, and quantity. It is to be noted that they have so perfected the system of urine examination that they are able to state clearly by this means alone the corresponding derangement of Vata, Pittha, and Kapha. In addition, they have a system of testing the urine with the help of Thailams (the explanation of this term is omitted), which greatly helps the diagnoses. This science is called the Neer-Nerakkuri-Naikkuri Shasthram."

Ayurveda in Practice.

Such in outline is the scientific basis of Ayurvedic medicine, from which the fundamental principles of treatment are deduced. It would be a mistake, however, to suppose that this comprises the whole of Ayurveda. Doubtless through the ages common sense and ordinary observation, apart from Ayurveda or any other system, have accumulated a store of knowledge of value, which may, not improbably, constitute the best part of Indian medicine. Moreover, the practical application of Ayurveda is probably a relatively simple matter as compared with the comprehension of the doctrine itself, running off, as it does, into the regions of theological speculation. For instance, the Ayurvedist claims to be able to tell beforehand whether a patient suffers from quinine idiosyncrasy: he ascertains the patient's Prakriti according to the Ayurvedic method, and he knows that a drug like quinine, with its peculiar Rasa, Veera, etc., must, according to Ayurveda, be used in small doses in certain Prakriti—for example, Vata Prakriti. In plain language this probably means that persons of robust habit are likely to show an excessive reaction to a drug having such a powerful taste as quinine. Western medicine, it is said, "has at present no means of recognizing a patient's Prakriti." This is a mistake; physiology is the science of the human Prakriti, and although it studies man in the mass and cannot at present measure the delicate shades of difference that distinguish one temperament from another or produce a final and cut-and-dried classification of temperament into three groups as Ayurveda does, it will in due time, no doubt, define the limits of variability within the normal, upon which temperament depends. Physiology has hardly approached the threshold of this subject, but even now it has advanced far ahead of anything that is possible under Ayurveda.

Conclusion.

The opinion is expressed in the report that no Western scientist should think of criticizing Ayurveda until he has learnt the Sanskrit language and studied the subject for some years under a competent Acharya. But the Western scientist has no need of any such prolonged and detailed study; he will, without the least difficulty, recognize the familiar features of the phase of development reached by Ayurveda, when he recalls the history of his own science. Similar unsupported metaphysical and theoretical dogmas were to be found in both. The "authority of the Scriptures" was regarded as equivalent to the truth in the one as in the other; and our grandfathers accepted without a doubt the account of the creation of the universe given by Moses, and regarded the first chapter of Genesis as the word of God. In the last hundred years science has emerged from the metaphysical stage into the clear light of positive knowledge, and if the Madras Government has the interests of the Indian people genuinely at heart, it will expend its energies in planting modern science in the country, by the agency of scientists and teachers trained in Western methods, instead of endeavouring to stimulate the belated indigenous systems into renewed activity.

There are many indications in the report that Ayurvedists feel the need of European methods—the microscope, bacterial

technique, etc. What they really need is an altered scientific outlook; they need to understand the difference between metaphysical and positive knowledge, between the study of facts through the coloured glass of theological dogma and their study in the plain daylight of science. The Madras Government is apparently at the parting of the ways. It will be interesting to see whether it decides to set things moving in the path of progress by the encouragement of European scientists, or pushes the country back into the old metaphysical rut.

HOSPITAL CONTRIBUTORY SCHEMES.

An Analysis by the Voluntary Hospitals Commission.

At the request of a conference of representatives of local voluntary hospital committees, held in July, 1922, the Voluntary Hospitals Commission undertook to issue a questionary on the methods pursued in various areas to obtain contributions, and to circulate to the local committees a summary of the information received. Replies were furnished in regard to 73 contributory schemes affecting 102 hospitals, and a statement summarizing the particulars given has now been circulated for the information of local committees and the hospitals in their areas.[1]

This summary is in narrative form, with little if any comment. It comprises sections dealing respectively with the machinery for working a contributory scheme, methods of collection, amount and remittance of contributions, the cost of collection, allocation of contributions, privileges of contributors, effect of schemes upon patients' payments, representation of contributors, methods of publicity, and factors influencing success.

Machinery of Contributory Schemes.

Local circumstances largely determine the machinery for working a particular contributory scheme. Whether the scheme will be worked for one institution, or in common for several, depends on the relations between the hospitals in the area; some are accustomed to acting alone, others to co-operating with neighbouring institutions. Another important factor is the nature and extent of local charitable organizations. Even more important is the character of the area served by the hospital—that is, whether the area is mainly rural or mainly industrial; and, if the latter, whether it is covered by a few highly organized industries. The variety of local conditions is reflected in the variety of methods that have been adopted for working contributory schemes; these range from a scheme worked by a single hospital through its own secretary and treasurer, to one worked by a highly organized hospital council on which there are representatives of all the hospitals in the area, of the city corporation, and of various trade associations and public bodies. Between these two extremes many kinds of organization are found.

Methods of Collection.

Almost every scheme known to the Commission relies for its contributions mainly upon deductions from wages, with the consent of the wage-earners and the active co-operation of their employers. An area containing a few highly organized industries offers the best field for this procedure. As a rule the weekly deduction is made by pay clerks at the works, and sometimes the employers add a contribution of their own. This is the usual and principal method of collection. But there are in addition other avenues through which funds are collected, and many schemes use them concurrently with the weekly deductions from wages; thus the residential population may be canvassed by systematic house-to-house collection, or by applications through the post. In many areas valuable help is given by trade unions and employers' associations. Collection in a rural area presents much greater difficulty, and even more difficult is the gathering in of regular contributions from the "self-employer."

Amount and Allocation of Contributions.

Many schemes have fixed twopence a week as the sum payable by each contributor. Others, however, permit the amount to vary between one penny and threepence, in some cases at the choice of the contributor. Sometimes the larger contribution covers privileges for the employee and his family, while the minimum sum would cover only the employee himself. Here and there the amount of contribution varies with the wages earned, upon a graded scale. In most schemes the services of a voluntary collector are available. Where it is shown separately in the accounts the cost of collection has not been observed to exceed 3 per cent. of the amount collected.

In the simplest forms of contributory schemes the whole of the contributions are paid to the hospital and are allocated to meet maintenance expenditure; they are rarely applied to capital purposes. In a number of schemes the hospital does not take the whole of the amount subscribed, but some allocation is made to other services, a percentage going, for example, to convalescent homes, nursing associations, and in one instance to dental services.

Privileges for Contributors.

Priority of admission for contributors, or free maintenance or treatment, as an inducement to attract members, is perhaps the most important and the most difficult feature in framing a contributory scheme. Many hospitals feel the necessity of offering some special inducement in return for the assured income obtained from regular contributors. On the other hand, it is generally recognized, and indeed often required by trusts and endowments, that the first claim on a voluntary hospital's accommodation and resources should be that of the necessitous poor. Moreover, the governing condition in the admission of patients should obviously be the urgency of the medical or surgical need of the case. With these considerations in mind most hospital authorities have been careful to avoid holding out any inducement which would bind them in a contractual obligation. But in one or two instances the hospital authorities have taken the risk of guaranteeing to all their contributors certain definite benefits, such as free maintenance or immediate admission and treatment. Some schemes, without pledging themselves to the admission and free maintenance of contributors, provide as an inducement certain special benefits and facilities not available to non-contributors. A very common form of inducement is the simple practice whereby contributors when admitted to hospital are maintained and treated free of charge without being asked to make a donation. In regard to eight of the contributory schemes, the promoters state that no inducement or privilege is accorded to the contributors, the hospital authorities relying, and with success, on the charitable instincts of their contributors, the sole criterion of admission being the urgency of the case. Thus, while a very small minority of schemes attempt to guarantee something in the nature of an insurance benefit, most of them rely upon the charitable instincts of the public and maintain the principle that the necessitous poor and the medically urgent cases must have the first call upon the resources of the hospital. Subject to that, the contributors in practice get facilities for admission and are not usually asked to make any further donation to the hospital. Sometimes additional privileges are provided; among these, facilities for convalescent treatment are very popular. It is noted that of all the schemes examined only four indicated that payments by patients have diminished as a result of the operation of a contributory scheme.

The representation of workpeople contributing upon the governing bodies of hospitals is recognized as an important element in contributory schemes, and very few make no provision for such representation. The manner of election and the basis of representation vary much, more particularly in relation to the machinery adopted for working the scheme. The bodies on which the workpeople's representatives serve also vary; in some places they have seats only on the board of management, in others they are eligible for election to the committee of management and the house committee. The contributors may have representation upon a purely financial basis, the contribution of a given sum entitling to the nomination of a governor or member of the managing committee; or the contributors as a body may be entitled to a fixed number of representatives; or, again, the

[1] Voluntary Hospitals Commission. Ministry of Health. 1923. V.H. Cmn. 10. To be purchased through any bookseller or directly from H.M. Stationery Office. Price 3d. net.

contributors may be accorded representation, but not on any fixed basis. The first two methods appear to be more popular than the third.

Modes of Publicity.

The methods of advertising the schemes show great variety; circulars, posters, leaflets, and notices in the press are common means of publicity. One hospital authority reports with quiet confidence that its contributory scheme "advertises itself." The utility of public meetings is generally recognized, particularly in villages. In industrial areas addresses at trade union meetings are frequently adopted. A featu common to the great majority of schemes is the holding of meetings, with the permission of the management, in the various workshops, at which the workpeople are addressed.

Lastly, the promoters of contributory schemes were invited to state any special features which they considered directly responsible for the success of their schemes, but the replies do not seem to afford material for any single generalization.

THE TRAINING OF MIDWIVES.

DR. JANET CAMPBELL'S REPORT.

THE Ministry of Health has issued this week a report on the training of midwives by Dr. Janet M. Campbell, senior medical officer for maternity and child welfare at the Ministry of Health, and chief woman medical adviser to the Board of Education.[1] This report supplements Dr. Campbell's previous memorandum on the teaching of obstetrics to students in the medical schools of Great Britain, reference to which was made in our issue of April 21st, 1923 (p. 692).

In a short prefatory note the Chief Medical Officer, Sir George Newman, explains that the facts on which the present report is based have been elicited as part of the larger inquiry by Dr. Campbell into the prevention of maternal mortality. More than 50 per cent. of the cases of childbirth occurring in England and Wales are attended solely by midwives. For the proper performance of this function it is obviously essential that the training of the midwife should keep pace with growing knowledge and with the requirements of modern midwifery practice.

Dr. Janet Campbell's report discusses the whole position and the present needs, and includes relative comparisons with the conditions of training in other European countries. In her introductory section she quotes the maternal mortality figures associated with childbirth, which during the past sixteen years have remained almost stationary. In 1907 there were 3.83 maternal deaths per 1,000 births, and in 1922 3.80. The lowest rate during that period was 3.55 in 1918, and the highest 4.12 in the two following years. Upon this the author observes:

> "During the present century the general death rate has steadily declined, and the standard of sanitation and general and personal hygiene of the country as a whole has been raised. It is, therefore, disappointing and surprising to observe that the improved training of midwives and the wider knowledge and application of methods of surgical cleanliness have not had more effect in reducing the maternal mortality and associated morbidity. This suggests that both doctor and midwife are still imperfectly educated in obstetrics."

Other sections of the report discuss in detail the training of pupil midwives and its effectiveness in equipping them for their subsequent work. In Dr. Campbell's opinion the period of training should be lengthened, the curriculum should be revised and reconstructed, and the training schools should be suitably graded. She recommends, further, the institution of a teacher's certificate, and also the registration by local supervising authorities of the monthly nurses and unqualified attendants who assist in the nursing of maternity patients. With these recommendations Sir George Newman expresses his concurrence.

In her concluding section Dr. Campbell summarizes her reasons for desiring a longer training for midwives and for the more general employment of midwives to the exclusion of unqualified women. These all turn on the prevention of maternal deaths and disease due to childbirth. She writes:

> "Unless we are content to leave matters much as they are and merely to hope for the slow and gradual improvement which will no doubt take place in time in relation to the general improvement of public health, energetic action in various directions is needed. The problem of maternal mortality is an extremely complex one. It cannot be solved by any one means, but rather by correlated action in several directions, medical, nursing and social. An essential factor is more competent professional attendance for women before, during and after childbirth than exists at present, and this can only be obtained by the better education of the medical student and the pupil midwife."

The five recommendations put forward by Dr. Campbell for raising the standard of training and practice for pupil midwives have been briefly indicated above. In regard to the period of training, her suggestion is that for unqualified women this should be extended from six months to twelve, and for trained nurses from four months to six, the examination for the certificate of the Central Midwives Board being taken at the end of the course. Revision and reconstruction of the curriculum should aim at organizing the midwife's education upon a broader basis so as to include clinical and theoretical instruction in the management of labour, both in maternity wards and on "the district." The grading of midwifery training schools should correspond with the facilities they are able to offer for a complete or partial training; the smaller institutions should be affiliated for teaching purposes with institutions able to offer complementary facilities, so that midwifery pupils, wherever they decide to train, may be sure of receiving reasonably uniform instruction in all parts of the curriculum. The "teacher's certificate" should ensure that those midwives who possess it have actually practised as midwives for a specified period, that they have not only received instruction in the theory and practice of their profession, but understand the relation of midwifery to the public health service and the social circumstances of the patients, and that they are themselves competent to teach students. The suggested registration of all monthly nurses, and of all handy-women practising maternity nursing for gain, would have the advantage of bringing these unqualified persons within the supervision of the Inspector of Midwives.

In conclusion Dr. Campbell maintains that as long as the employment of midwives is an essential and integral part of the midwifery service of the country, it is the duty of the State and of local authorities to ensure that as far as possible a midwife is a competent and safe practitioner. In view of this responsibility she suggests that midwives should receive such official encouragement and financial help as may be necessary to enable them to follow their profession under conditions of reasonable comfort and security. It can scarcely be doubted that the enforcement of a better standard of midwifery and maternity nursing would materially assist in reducing the unduly high incidence of maternity mortality and of morbidity due to childbirth.

[1] Ministry of Health. Reports on Public Health and Medical Subjects. No. 21. London: H.M. Stationery Office. 1923. 1s. 3d. net.

Nova et Vetera.

HIPPOCRATES.

WE hear often enough, and perhaps truly enough, that the classics of medicine are little studied, but few years pass without the payment of some tribute to the mighty dead. Early this year, Professor Georg Sticker of Würzburg published a translation of the *Epidemics* 1 and 3 of Hippocrates with an introduction,[1] and now Mr. W. H. S. Jones issues the first instalment of his translation of the complete works for the Loeb series.[2] These books are complementary. The scholarly attainments of Professor Sticker are well known, but his point of view is that of the physician and epidemiologist—he is even a trifle contemptuous of the mere philologist; Mr. Jones demonstrated in an earlier work that his knowledge of the subject-matter of medicine was by no means despicable, but his point of view is that of the trained, exact scholar. In his introduction, Professor Sticker has given rein to a disciplined imagination and created a Hippocrates fit to inspire affection as well as reverence. He would be a pedant indeed who was not charmed by the story, but it would hardly be

[1] *Klassiker der Medizin.* Herausgegeben von Karl Sudhoff. Bd. 28. 1923. Leipzig: J. A. Barth.

[2] *Hippocrates*, with an English translation by W. H. S. Jones. Vol. I. London: W. Heinemann; New York: G. P. Putnam's Sons. 1923. (Fcap. 8vo, pp. ix+361. Cloth, 10s.; leather, 12s. 6d.)

suitable as the preface of a non-medical writer's edition. Mr. Jones includes seven of the Hippocratic treatises in the present volume, among them that on Ancient Medicine, on Epidemics (1 and 3), and on Air, Waters, and Places, which are, next to the Aphorisms, the best known of the collection. Of the scholarship of his work, in the technical sense, we have no pretensions to speak. The days of the omniscient journalist are long past. Whether Mr. Jones is right in saying that "there are two common words for pain in the *Corpus*, *πόνος* and *ὀδύνη*. They seem practically synonymous," or Professor Sticker is right in asserting that *πόνος* does not mean simple pain but effort (*Anstrengung*) or painful effort (*Mühe*), is one of many points which none but an expert can decide. Mr. Jones says that in his work he has been "constantly impressed, and depressed, by the truth of the proverb, 'translators are traitors.'" It is a depressing thought because Hippocrates must be read in translation by the vast majority of those who wish to read him at all. Mr. Jones's version is at least readable, praise which can by no means be given to all translations, some of which, as Professor Sticker says, are harder to understand than the Greek text. Neither German nor English, perhaps, is so good a medium as French for the representation of Greek, and, while Mr. Jones is much more readable than Fuchs and quite as good as Adams, he is not, we think, so good as Littré. But Littré is a book for the library and to Mr. Jones belongs the privilege of interpreting Hippocrates' message to the rising generation of English students and physicians. What is that message? In the *Corpus* there is material for intellectual pleasure of many varieties. To the ripe scholar of the school of Sir Clifford Allbutt, to gather up the threads of philosophical thought, to observe their intercrossings, to note the influence of hypothesis upon practice, must ever be a fascinating hobby. To the epidemiologist, attempts to reconstruct the whole method of which the first and third Epidemics are a fragment must always give pleasure and instruction. On a much lower plane, the identification of Hippocrates' "diseases" appeals to the Sherlock Holmes in each of us. But none of these appeals is universal; Hippocrates does not belong to the company of the immortals merely because he stimulates our intellectual curiosity. It is not hard to show in what way Hippocrates is much greater than all this implies. Many passages might be quoted in illustration; we content ourselves with one.

"But medicine has long had all its means to hand, and has discovered both a principle and a method, through which the discoveries made during a long period are many and excellent, while full discovery will be made, if the inquirer be competent, conduct his researches with knowledge of the discoveries already made, and make them his starting-point. But anyone who, casting aside and rejecting all these means, attempts to conduct research in any other way or after another fashion, and asserts that he has found out anything, both deceives and is deceived."

Bishop John Wordsworth once spoke of the difficulty of reconciling the Jewish idea of the ordering of events in an historical and spiritual progress, the world conceived as a whole in time, and the Greek idea, the world conceived as a wonderful order, a harmony of parts of which the individual man is the centre or at least the proper spectator, and implied that Pauline Christianity effected the reconciliation. In the philosophy of medicine there has always been a similar conflict—in effect, the conflict of empiricism and rationalism, in the narrow sense of the words. Hippocrates saw how to reconcile these philosophies. He saw that the data of observation should be, for the physician, ultimates, and that the task of reason was to discover the relations between these ultimates and to infer secondary consequences. He relied, as Mr. Jones put it, "on careful observation and critical examination of phenomena, hoping thereby to reach, not the complete and perfect knowledge Plato hoped to attain through his Ideas, but an approximation to truth." The philosophical harmony which Hippocrates fashioned was soon destroyed. Among the intellectuals, "the transcendent genius of Plato, strong in that very power of persuasion, the use of which he so much deprecated, won the day. The philosophic fervour which longed with passionate desire for unchangeable reality, that felt a lofty contempt for the material world with its ever-shifting phenomena, that aspired to rise to a heavenly region where changeless ideas might be apprehended by pure intelligence purged from every bodily taint, was more than a match for the humble researches of men who wished to relieve human suffering by a patient study of those very phenomena that Plato held of no account." On the other hand, empirics, alienated from philosophy, became—mere empirics. What ruined Greek medicine and ultimately reduced it, as Mr. Jones well says, from "rational treatment to wild speculation and even quackery and superstition," was intellectual vanity, belief in the all-sufficiency of reason. The reconciliation which, in the religious sphere, Paul sought to effect by the conception of the union in Christ of power (*δύναμις*) and wisdom (*σοφία*) Hippocrates had already effected in our humbler sphere. Not by the mere politician's method of compromise; if one party shouts white, the other black, it takes no genius to proclaim that grey is best; Horace was not a first-rate thinker. The real harmonization was to show how that potent instrument, man's conscious reason, should be employed upon phenomena. In the tractate from which we have quoted, Hippocrates showed the evolution from and dependence upon physiology—the physiology of diet—of treatment; he was already in possession of a method which we esteem a product of modern times, which indeed *was* utterly neglected for more than a thousand years.

It will be said, all this is obvious, we have learned the lesson now. Have we? Perhaps of the essentials of medical knowledge, study of gross anatomy and study of the human mind diverge farthest one from the other. Let us see how far, in the judgement of the Chief Medical Officer of the Ministry of Health, the Hippocratic synthesis has been effected in our schools of medicine in each of these branches of knowledge. Of anatomy he writes:

"Lastly, there has been in many cases insufficient explanation and application of the principles of Anatomy, and hence the meaning and purpose of its study have been lost. It has been robbed of its heritage and reduced to the routine and detailed analysis of a scrapped machine, and the only goal has all too frequently been the examination test."

In other words, a narrow empiricism without philosophy. Of the mind, Sir George Newman writes:

"Pure psychoneuroses or bodily derangements coloured by a psychoneurotic element will provide the general practitioner of medicine with a very large proportion of his most difficult cases. Yet at present we teach the student nothing of the make-up of the normal mind; we give him no help in separating the false from the true in the wordy strife as to the nature, etiology and treatment of psychoneuroses. . . . The mental hospital deals mainly with advanced disease or end-results, the practitioner should meet with incipient conditions. But his undoing is his helplessness *because of his lack of training*. He has often been taught in a perfunctory and theoretical way regarding the gross forms of melancholia, mania or dementia, but he has not had the whole subject presented to him in a broad and comprehensive way as something which *may* concern the recovery of every patient who consults him."

Here we have a narrow philosophy uninformed by rational empiricism. So, it would seem, the Hippocratic doctrine is even yet imperfectly assimilated. The reader may still learn from Hippocrates truth which he does not know or does not obey. But if he would learn this truth he must take to heart a little sermon, preached indeed to Germans, but having a message for Englishmen, which we extract from Professor Sticker and may fitly use as a peroration.

"For every word of the living Hippocrates there must exist a living German word. The translator's best hope of finding that word is if he is ignorant of the perverse, would-be elegant, technical jargon with which qualified doctors in the twentieth century, especially in Germany, torment themselves and, more's the pity, must employ, or if he has the force to rise clear of this fog of medical jargon. No doubt, in German-speaking countries we shall be found unintelligible or affected if we use homely German words, say flux instead of catarrh, talk of hot and tedious sicknesses instead of acute and chronic

affections, of the happenings of an illness rather than of its symptoms, of falling sick instead of being attacked, of a decision instead of a crisis, of a recognition and a distinction rather than of a diagnosis and a differential diagnosis. In truth we physicians have carried to a pitch of perfection the art of which Nietzsche speaks, the art of hiding from ourselves the things with the words and names we tack to them. This art will not help us with Hippocrates. He unconditionally demands sincerity and simplicity. His language, in which every word has its particular primary connotation, deliberately avoids the technicalities of a medical guild; he uses only such designations as were intelligible throughout Hellas—which is why, for instance, he chooses the natural seasonal signs and not the civil names of months, which varied from state to state. Hence he can hardly be misunderstood, not even after thousands of years, if one only has the good will to take him as he stands. This also is why it is so hard to translate him into a foreign speech burdened with a vocabulary of borrowed words."

England and Wales.

Sheffield Joint Hospitals Council.

The Sheffield Joint Hospitals Council was formed for the purpose of developing the "penny in the pound" scheme of employees' contributions to hospitals. The first annual report of the council has just been issued, and from this and from pamphlets and news sheets published for propaganda purposes it is possible to obtain information as to the nature and extent of the scheme. The council includes representatives of the corporation, the Cutlers' Company, the University, the hospitals, the Edgar Allen Institute, boards of guardians, the Trades and Labour Council, the Insurance Committee, the British Hospitals Association, the Hospital Sunday Fund, the press, and the contributors, together with six "general" members. The work of the council is managed through seven committees. The president of the council is Councillor M. Humberstone, J.P.

The "penny in the pound" contributions are collected by the employers, who are invited to add not less than one-third to their employees' contributions. Large firms are asked to send the contributions monthly, small firms quarterly. The contributions from firms and employees are pooled by the hospitals, and, if desired, the penny in the pound contributory fund takes the place of existing contributions to voluntary hospitals. Books of vouchers or letters of introduction are supplied to the firms, entitling contributors and their dependants to treatment free of maintenance charges at any of the Sheffield hospitals. Contribution confers no guarantee of treatment at a voluntary hospital. There is no income limit, but contributors who are able to pay nursing home fees are asked not to avail themselves of the free facilities under the scheme. Non-contributors, if admitted to a hospital, are requested to pay a charge of not less than 35s. a week towards their maintenance. Necessitous persons are admitted free. Arrangements are being made to extend the scheme to shopkeepers and small traders. A "Sheffield and District Association Hospitals' Contributors' Council" has been formed for the purposes, amongst others, of nominating agreed representatives of contributors to the managing boards of hospitals and of safeguarding generally the interests of subscribers. Each contributing firm is asked to form its own hospitals committee, which will elect representatives to attend delegates' quarterly meetings arranged by the contributors' council. The Joint Hospitals Council also offers to contributors convalescent benefits, nursing facilities, and motor ambulance transport. In areas lying outside the city of Sheffield the management and employees of firms are encouraged to distribute their contributions under the "penny in the pound" scheme to all hospitals *pro rata* to the cost of hospital service rendered to their contributors.

Thanks to the support of the "penny in the pound" scheme the income of the four voluntary hospitals of Sheffield is now equal to the current expenditure. But the hospital accommodation is inadequate; and it is hoped shortly to increase the number of beds by 50 per cent. The Hospitals' Contributory Scheme aims at the enrolment of 250,000 new and permanent contributors, and every effort is being made to induce every professional, commercial, and municipal establishment in the area to adopt the scheme. The Joint Hospitals Council of Sheffield has distributed the grant made by the Voluntary Hospitals Commission to Sheffield hospitals; has set up the Sheffield Voluntary Hospitals Committee to advise the Commission; arranged during last winter a series of health lectures through a joint advisory committee on health education; and carried out active propaganda in connexion with its activities. The work of the Sheffield Joint Hospitals Council will be watched with great interest, the more so because in many particulars it transgresses the lines laid down by various bodies for such efforts; but in any case the experience of Sheffield will be of great value to voluntary hospital managers generally.

Post-Graduate Courses in London.

The Fellowship of Medicine and Post-Graduate Medical Association announces that a fortnight's "refresher" course in general medicine and surgery will be given at the London Temperance Hospital in conjunction with Bethlem Royal Hospital, North-Western Fever Hospital, and the Royal Westminster Ophthalmic Hospital, from October 8th to 20th. The course will include daily lectures and clinical demonstrations in the wards and out-patient departments. A course on genito-urinary diseases will be given at St. Peter's Hospital from October 1st to 27th. In addition to demonstrations in the out-patient department a series of lectures will be given on various aspects by the members of the staff. A course of eight lectures on tropical diseases will be given by Dr. Low and Dr. Manson-Bahr at the School of Tropical Medicine, beginning on Tuesday, October 2nd. The subjects considered will be the more important diseases of tropical countries. A course in laryngology, rhinology, and otology, consisting of clinical demonstrations and lectures, will be given at the Central London Throat, Nose, and Ear Hospital, from October 8th to 26th, from 9.30 a.m. to 5 p.m. on each day. Courses on children's diseases will be given at the Victoria Hospital for Children, from October 8th to 28th, and in ophthalmology at the Royal London Ophthalmic Hospital, from October 8th to November 3rd. The National Hospital for Diseases of the Heart will give a fortnight's course on cardiology, and St. Mark's Hospital for Diseases of the Rectum on proctology, respectively, from October 15th to 27th. Copies of the syllabus and further particulars regarding any of the above courses will be forwarded on application to the Secretary to the Fellowship of Medicine, at No. 1, Wimpole Street, London, W.1.

Small-pox in London.

Small-pox has again appeared in the metropolis, eight cases having been recognized between September 7th and 11th. They are widely distributed, in Camberwell, Westminster, Paddington, Finsbury, Greenwich, Lewisham, and Willesden. A common source of infection has so far been discovered in four of them. A lady recently arrived from Spain and stayed for a short time at an hotel in the West End. She was indisposed, but was not seen by a medical man, and suspicion was not aroused until a maid who had waited on her was found to be suffering from small-pox. The lady had left the hotel, but was discovered staying with relatives. The house was visited by the medical officer of health, who found that the lady's sister was also suffering from small-pox. Further inquiry resulted in the finding of two other cases, contacts with the hotel case. At the time of writing the source of infection of the three additional cases has not been ascertained, but one of them may belong to the group in question. Meantime, all the known cases have been removed to hospital. No official statement has been made as to the type of the disease, but certain of the cases are said to be severe, and the fact that the infection came from the Continent makes it not difficult to believe in severity of type. It may be safely assumed that inquiries are being actively made as to contacts and that every precaution is being taken by the authorities. In the meanwhile it ought not to be necessary to emphasize the crucial

consideration, that no one at present unprotected or insufficiently protected need have the least fear of the disease if only he will undergo vaccination or revaccination.

Ireland.

MEDICAL REPRESENTATIVES IN THE DAIL.

OF five medical representatives who sat in the last Dail three have been re-elected in the last election—namely, Sir James Craig, M.D., Dr. Richard Hayes, and Dr. Myles Keogh. Sir James Craig was one of the three representatives elected, without a contest, for Dublin University. Dr. Hayes was elected at the head of the poll for Limerick, and Dr. Keogh was elected for South Dublin. These three members are keen medical reformers. Sir James Craig and Dr. Richard Hayes have outlined, from time to time, important schemes of medical reform, and in this way have done a great deal to enlighten the public with regard to the urgent necessity there is in Ireland for far-reaching measures of medical legislation. Amongst the anti-treaty party elected there are no fewer than five members of the medical profession, two of whom are dispensary doctors. These members include Dr. Kathleen Lynn, who has done a great deal of medical work amongst the poor in Dublin. It is, however, understood that she and her colleagues will not sit in the present Dail, and therefore cannot help within that body in the formulation of any medical schemes. It is to be regretted also that Sir James Craig is the only member of the profession amongst the six representatives elected for Dublin University and the National University. The other five university members are members of the professorial staff, and it is believed they are all quite alive to the pressing necessity there is to bring the Free State abreast, in medical affairs, with other countries in Western Europe and America. The Labour party has not come back to the Dail as strong as was expected. The Labour party, more than any other organized body, took the keenest interest in medical legislation in the last Dail.

SALARIES OF TUBERCULOSIS OFFICERS.

At a recent meeting of the Kildare County Council a letter from the Local Government Department was read relative to the proposal to increase the salary of Dr. J. P. Daly, tuberculosis officer, to £700 per annum, rising by annual increments of £20 to £900 per annum. The letter pointed out that Dr. Daly's present remuneration of £500 compared favourably with the salaries of the great majority of the tuberculosis officers in other counties, some of whom were responsible for the supervision of local institutions. Moreover, there had been but little development of the county tuberculosis scheme, which was still in an imperfect condition, without a central tuberculosis dispensary or suitable provision for the accommodation of advanced cases. The Ministry considered that the character of the scheme would not in any case justify the proposed increase of salary, which seemed to be framed on an excessive scale, and having regard to the existing conditions no adequate case had been made out at present for revision of the tuberculosis officer's remuneration of £400 yearly salary and £150 bonus. The Ministry suggested that it would be desirable to defer further consideration of the matter pending the carrying out by the council of the necessary extension of the county scheme, when a further proposal involving a reasonable adjustment of Dr. Daly's basic salary might be submitted. Having considered this letter, the council unanimously decided to allow the full civil service bonus.

HEALTH OF BELFAST.

Dr. Bailie, superintendent medical officer of health for the city of Belfast, has presented his report for the year 1922. It is a well printed volume of 86 pages, with thirty-four tables of statistics, numerous minor tables, and a good index.

No census was taken in 1921, so that the population of 425,000 is an estimate; and estimates of population, as is pointed out, become more unreliable with every year from an actual census. The birth rate calculated on the estimate was 25.1, a decrease of 1.2 from that of the preceding year; and the death rate was 14.8, a very satisfactory figure when comparison is made with the rates of twenty years ago, but still an increase of 0.4 on 1921. There was a reduction of 0.8 per 1,000 of population in the death rate from zymotic diseases (0.6 per 1,000 of population in 1922, and 1.4 in 1921), and an increase of 0.4 in deaths from chest affections. Deaths of children under one year old per 1,000 births were 94, which is 21 per 1,000 less than that for 1921.

The centres established in 1917 under the maternity and child welfare schemes are working satisfactorily, and are well attended by expectant mothers; 2,746 medical examinations of babies were made. The scheme for the medical inspection of school children, which had been hung up by the war and post-war difficulties, was finally adopted in October, 1922, approved by the Ministry of Home Affairs, and put into operation. The town has been clear of small-pox now for two years. Scarlet fever, diphtheria, whooping-cough, and measles still figure as chief executioners in the "massacre of the innocents."

Excellent reports are included from the heads of departments, one from Dr. Gardner Robb, visiting physician in charge of the Purdysburn Fever Hospital, full of valuable information, but unfortunately not including his views or recommendations as to how to lessen the prevalence of diphtheria and scarlet fever; both diseases are a real danger, a horrid cause of anxiety to everyone, and of serious economic loss to the community. The report from Dr. N. C. Graham, city bacteriologist, from the City Bacteriological Laboratory, shows that 4,351 specimens were received for examination, and there is a report also from Professor Symmers, of the Queen's University Laboratory. It is presumably a slip in including "Vaccines" (161) and "Tuberculin diluted" (22) under the same heading as "examinations" of "ice cream," "cockles," "roast chicken," etc. In the report of Captain Barry, M.R.C.V.S., the city veterinarian, on meat inspection, one figure alone—"320 cows condemned"—shows the necessity of this department; the carcasses of 255 tuberculous cows were totally destroyed.

The whole report affords evidence of activity and advance; and it is a pity that the inhabitants generally do not take more interest in the health of their city; however, the educative effects of the daily newspapers in their articles on the report, combined with the gradual spread of the study of "civics," will in time ensure for the authorities more and more support. Dr. Bailie refers to the necessity of having all cases of throat trouble promptly examined and treated; no one will gainsay such a statement, but it would have more weight if there had been a table from Dr. Gardner Robb reiterating in actual figures the evil effects of delay, especially in very young children; and such proof should be sent to the public press, and to every medical man, clergyman, and babies' club in the city. These annual reports, or part of them, being a stocktaking of the health of a community, should be made appetizing, and so educative, for the general public.

A slip or minor flaw appears in the third column of Table 2, page 7; the decimal point changes its position several times in the column; this tends to confusion on rapid reading. The figures under the "total" column, Section VI, page 14, are wrongly placed. A graver omission is the want of fuller reference to cancer, which caused 347 deaths, to bronchitis and pneumonia, 1,159 deaths, and to heart disease, 675 deaths. Are there no preventive measures, no warnings to the public, as regards these diseases?

TUBERCULOSIS WORK IN BELFAST.

In his report on the work of the Belfast Tuberculosis Department in 1922, the chief tuberculosis officer, Dr. Andrew Trimble, expresses regret that the Government of Northern Ireland has not found it yet possible to take a census of the numbers and condition of the people. In the absence of accurate figures it is only possible to calculate rates on estimated figures. He notes, however, with pleasure that the Government recently announced its

intention of taking a census in 1926. A notable feature of the report is its indication of a diminishing death rate from pulmonary tuberculosis in Belfast. For four years in succession the mortality has declined. In 1922 it was 1.5 per 1,000, a reduction of 45 per cent. as compared with 1918, and of 68 per cent. as compared with 1890, when the death-rate was 7.4 per 1,000. A corresponding fall occurred also in non-pulmonary forms of tuberculosis; here the rate now stands at 0.36 per 1,000, as compared with 0.74—a reduction of more than 50 per cent. since 1918. These figures reflect credit on the department and give promise of still greater success in the future, both among adults and children. Dr. Trimble prefaces his tabulated analysis of the year's work with a brief outline of the history of the movement for combating tuberculosis in Belfast, the method by which patients come into touch with the department, and the resources at his disposal for the treatment of the disease. It is now seven years since an agreement was entered into between the Belfast Corporation and the Belfast Insurance Committee, whereby the Corporation undertook the treatment of all tuberculous insured persons within the area. In 1918 the present Central Tuberculosis Institute was opened; in 1921 the Municipal Hospital for Tuberculous Children, with an open-air school in its grounds for contacts of tuberculous patients, was established. Each patient before being examined at the tuberculosis institutes must bring with him a letter from a medical practitioner stating that in his opinion the person named is suffering from tuberculosis and requires treatment. If, after examination, the patient is found to be suffering from tuberculosis, or from suspicious symptoms, he is placed under treatment either with his own doctor, or at one of the institutes, or at the sanatorium. Of the patients found to be suffering from tuberculosis during the year more than 42 per cent. had had an admitted personal association with tuberculosis amongst other members of their families. In many cases, as the result of inter-infection, whole families in Belfast have been wiped out by the disease, though such disasters are becoming less frequent. But (adds Dr. Trimble) the fact that so large a percentage of detected tuberculosis is apparently traceable to association with other known cases makes the continuous supervision of the home conditions by the nurse all the more necessary. As might be expected, tuberculosis falls most heavily on the older, poorer, more land-locked, and more densely populated districts of the city. During the year an educational propaganda was continued by means of illustrated lantern lectures, and Dr. Trimble looks forward to the development of this into a much more ambitious and more comprehensive scheme in the near future. His report ends on a hopeful note:

"When time is given for the work which is now being done amongst children to mature, I am confident that the death rate from tuberculosis will decline with increasing rapidity, and that which to-day is designated a 'problem' will to-morrow take its place along with the 'problems' of plague, typhus fever, and small-pox."

Scotland.

SCOTTISH ASYLUMS' PATHOLOGICAL SCHEME.

THE Board of the Scottish Asylums' Pathological Scheme in its report for 1922 records high appreciation of the valuable research work carried out by the late Dr. Ford Robertson, whose lamented death took place on July 17th of this year (an obituary notice appeared in our issue of August 11th, p. 264). Dr. Ford Robertson had acted as superintendent of the Laboratory since the commencement of the Scheme in 1897; under his able direction the Laboratory increased its scope and usefulness and attained its present important position. His report indicates that the work of the Laboratory proceeded along the usual lines during the year under review. Many specimens sent from the contributing asylums were examined and reported on; these examinations consisted of a complete bacteriological analysis of the flora of the intestinal tract, urine, and naso-pharynx, representing a vast amount of detailed work. Several visits were paid by Dr. Ford Robertson to asylums, to guide and advise as to bacteriological examinations and treatment. His research work in 1922 was mainly directed to further investigations into the toxic origin of dementia praecox. As a result of his extended study and experience he was able to report considerable progress in the treatment of this malady by therapeutic immunization with suitable vaccines. His own observations confirmed very fully the great frequency of deep alveolar infection of the dental roots in dementia praecox reported by Dr. Henry A. Cotton of New Jersey. The bacteriological investigations carried out by Dr. Ford Robertson during recent years in the Scottish Asylums Laboratory convinced him that in all cases of dementia praecox there was a severe condition of chronic intestinal infection by anaerobic bacteria with distinct neurotoxic properties. "I cannot carry these investigations much further in the Laboratory alone; the time has come when the efficacy of the therapeutic measures that seem to be clearly indicated must be tested on a large scale in the asylums." He therefore appealed to the Board to provide him with a laboratory or wards for therapeutic investigation, in order that early cases of dementia praecox could be treated by the methods found successful in private cases.

Correspondence.

THE INNERVATION OF THE UTERUS.

SIR,—The paper published in your issue of September 8th by Messrs. Beckwith Whitehouse and Featherstone appears to represent a definite advance in our knowledge of the neuro-musculature of the uterus, and their work is worthy of the greatest attention. It is unnecessary to stress the physiological interest of the subject and its far-reaching importance in obstetric and gynaecological practice; but the complexity of the problems involved only becomes apparent on serious consideration of the conflicting evidence and the difficulties of attack.

Having quite independently noted the same phenomena in performing Caesarean sections under spinal anaesthesia at different stages of pregnancy, I can fully endorse their observations in that direction. One must also admit the obvious attraction of their interpretation and general hypothesis. It is only an appreciation of the intricacy of the question that prompts a plea for the more exact record of detail, for uniformity of nomenclature, and for extreme caution in elaborating a theory.

Unfortunately there are serious objections to the direct experimental line of research. In the first place, uterine innervation varies considerably in different animals: in the rabbit, the sympathetic nerve is motor to the uterus, whether pregnant or non-pregnant; in the cat it is motor to the pregnant but inhibitor to the non-pregnant uterus; and in the guinea-pig it is inhibitor to both. Moreover, there are such variations in the anatomy of the autonomic nervous system and particularly in the general conformation of the uterus in animals as to make it exceedingly difficult to express experimental results in terms of the human uterus. Monkeys very rarely breed in captivity, and are therefore not available for the purpose, at any rate in this country.

For obvious reasons we must generally reject pharmacological and other experiments *ad hoc* on the human subject; there are also technical difficulties in recording scientific observations thereon. I have considered electro-myographic methods; but at the present time there appear to be inevitable sources of error. Anatomical and histological studies in this direction are not inspiring, nor are the recorded movements of isolated muscle strips from various parts of the human uterus and under various forms of stimulation. All this implies that we must respect the clue discovered by Messrs. Whitehouse and Featherstone, and I trust that a few minor criticisms may not be out of place.

There is a tendency to assume *a priori* that the uterus, in common with non-striated muscle in general, has a double nerve supply: sympathetic (hypogastric) and parasympathetic (sacral). This assumption is supported by the naked-eye appearances of the human pelvic plexus. Nevertheless, such responsible observers as Langley and Anderson,

Gaskell, and Dale and Laidlaw have been quite unable to find any evidence whatever in the cat, rabbit, or guinea-pig of a sacral supply, although certain of the sacral nerves definitely afford parasympathetic innervation to the bladder, rectum, etc. There is certainly evidence to show that motor and inhibitor influences reach the uterus even in these animals, but they both appear to travel via the hypogastric plexus.

In the human subject it is commonly recognized that the efferent sympathetic fibres of the hypogastric plexus have their direct or indirect origin from the cord at levels not lower than the second lumbar nerve. They are ultimately reinforced by fibres from two of the sacral nerves, usually the second and third, which afford the parasympathetic element. Between the second lumbar and the second sacral no fibres are supplied from the cord to the autonomic system. Are we to assume from the observations under consideration (1) that in woman, as opposed to the above mentioned animals, the uterus receives a sacral supply, (2) that the observations of Langley, etc., are incomplete, or (3) that the spinal anaesthetic, and presumably the pithing, eliminates one element only of the sympathetic supply proper which emanates from the cord above the second lumbar level? The only other possibility, as far as one can see, is to postulate an autonomic reflex over and above the purely local system, and independent of the central nervous system. I imagine that the latter would not be accepted by physiologists without very definite evidence.

It would appear most important, in view of these considerations, to note the exact level of anaesthesia attained in each case. It would also appear advisable to conform to the commonly accepted terminology, in order to avoid misunderstanding: thus the term "autonomic" is usually applied comprehensively to include the visceral nerves in general—that is, (*a*) the sympathetic proper, and (*b*) the parasympathetic (bulbo-sacral) system. Such a term as "lumbo-sacral autonomic" inevitably creates some confusion, and is difficult to interpret in view of the facts.

Such points are not of merely academic interest. The whole subject is as important as it is difficult of approach; consequently it demands the utmost precision and clarity of expression at every step. The satisfactory demonstration of a definite and tangible form of reciprocal innervation would at once suggest a wealth of therapeutic applications in the fields of obstetrics and gynaecology alike. On this account alone there is every reason deliberately to chain our imagination to the established facts.—I am, etc.,

FRANK COOK,
Guy's Hospital, S.E., Sept. 9th. Beit Memorial Research Fellow.

COLOSTOMY AFTER TRANSPLANTATION OF URETERS.

SIR,—There is no condition, I think, in the catalogue of human ills which causes more distress both to mind and body than those ailments of the bladder which are characterized by incontinence of urine. It is needless to dilate upon the horrors of such a condition.

Quite recently, to relieve this condition, I implanted both ureters in the upper end of the rectum, using the transperitoneal method. The operation was not by any means difficult and in its results most gratifying. It was when the operation was finished that the idea occurred to me of making the operation of greater benefit in the future than it has been in the past by adding a complete colostomy with division of the colon to the original procedure.

The great objection to the transplantation of the ureters hitherto has been the fear of infection spreading from the bowel to the kidneys via the ureters. This danger would certainly be diminished if the whole of the lower segment of large intestine was definitely converted into a reservoir for the urine and no longer employed for the storage of normal bowel contents. Free irrigation of this reservoir for a week or two would probably rid it of a large proportion of the organisms normal to it as a rectum. Experience alone can show whether the colostomy should precede or follow the implantation.

My own idea, based upon a limited experience, is that the implantation will be easier to do if the colon is untouched, but that immediately the implantation is finished, at the same sitting, the colon should be divided, the upper end brought out through the abdominal wall, and the lower end invaginated into the rectum. A large rubber tube fixed in the anal aperture for the first forty-eight hours will allow the urine to escape as fast as it is secreted, and so prevent leakage at the site of implantation.

Of course, my suggestion adds another risk to the operation, but the added risk is not very great, and when the incontinence is not due to a rapidly growing tumour it holds out a hope of prolonging the patient's life and diminishing his or her suffering before the oft-prayed-for end comes.—I am, etc.,

Dublin, Sept. 10th. THOMAS MYLES.

DIATHERMY IN PULMONARY TUBERCULOSIS.

SIR,—I have been interested in reading, in your issue of August 25th, the reports of the papers by Drs. E. P. Cumberbatch and F. Howard Humphris on medical diathermy, more particularly in the references to the treatment of pulmonary tuberculosis by this method. I have been using diathermy in the treatment of pulmonary tuberculosis for some two years, with very encouraging results. A paper of mine was published in the *Practitioner* in October last.

When I first began to use diathermy for this disease I was unaware that it had been previously tried. But I have since heard of other workers in both the United States and Germany who speak highly as to the results obtained. In a recent communication Dr. Burton B. Grover, of Colorado Springs, U.S.A. (the Mecca of the American tuberculous), informs me that he has found diathermy give far better results than any other method of treatment in this disease. Even advanced cases receive benefit, whilst early and moderately advanced cases show a good proportion of "arrests." My own results confirm this. I have treated advanced cases with cavitation, but have not seen haemoptysis result.

It might interest Dr. Humphris to know—having regard to the last paragraph of his reported paper—that the Ministry of Health sent their representative to inquire into my technique and results by this method in January last, and that as a result the Hull Corporation (of which I am a member) have recently installed the apparatus in their tuberculosis sanatorium at Cottingham, E. Yorks.

I might add that for the last few months I have been treating my cases of this disease with ultra-violet radiation in addition — exposing gradually increasing areas of the trunk to the tungsten arc lamp for a few minutes twice or thrice weekly. By these means, I believe, I have still further improved my results.

I do most strongly urge that this method should be brought more prominently before the notice of the profession, and be given a reasonable trial throughout the country.—I am, etc.,

Hull, Aug. 27th. PERCY HALL.

SPIRITUAL HEALING.

SIR,—There seems good reason to doubt whether the medical profession generally has appreciated the extent of the movement towards the establishment of spiritual healing as a definite part of the work of the clergy. The position of the Roman Catholic Church seems to be quite clear. It teaches—I believe has always taught—that miracles may still occur, but that they must be preceded by an act of faith on the part of the sufferer. The ceremonies at Lourdes, and others derived from the practice at Lourdes, appear to indicate that the Church holds that the sufferer's faith may be sustained and comforted by the expression of a similar faith by others around him. This doctrine seems to be frankly accepted by a certain section of the Anglican Church at least; but a similar belief, not quite so frankly stated or so loudly proclaimed, appears to be entertained by other sections not generally credited with holding extreme views.

I took the opportunity recently of attending a special service, held weekly, in one of the principal churches of a large seaside town. It was very quietly conducted. After the Lord's Prayer the minister read a short address in which the efficacy of prayer was insisted upon. A long list of persons desiring the prayers of the congregation was read

out and the nature of their diseases mentioned; short intervals were allowed for private prayer. It was also stated that one or two persons who had been prayed for on a previous occasion were in better health. There was no rhetorical or emotional appeal.

The position of the medical profession is undoubtedly difficult. On the one hand, it is anxious not to offend the faith of many of its own members or of the general public; on the other hand, it will be generally disposed to accept the conclusion of the Committee of Inquiry into spiritual, faith, and mental healing, which made a preliminary report in 1914 to the effect, as was recalled in the JOURNAL of September 8th, "that 'faith' or 'spiritual' healing, like all treatment by suggestion, can be expected to be permanently effective only in cases of what are generally termed 'functional' disorders. The alleged exceptions are so disputable that they cannot be taken into account."

The object of this letter is to suggest that the Committee, which stopped its inquiry owing to the war, should now be reconstituted, and, as was suggested in the report of 1914, go on to direct its attention to a careful inquiry "into the evidence for cases of asserted cure by 'spiritual' or 'mental' healing of organic or other serious disorders submitted for investigation." I do not at the moment recall the constitution of the original Committee, but it contained both clerical and medical members, and I believe I am right in saying that Bishop Ryle, Dean of Westminster, was its chairman. He has shown that his interest in the matter continues by allowing an address on the subject to be given in the Abbey by the Rev. R. C. Griffith. Would it not be well to ask Bishop Ryle to start the Committee again?—I am, etc.,

September 9th. M. D.

SIR,—In your annotation (September 8th, p. 428) on the above subject you refer to the address by the Rev. R. C. Griffith delivered in Westminster Abbey, and give the following quotation from his remarks: "'I myself,' he said, 'have seen blind people see. We have seen one with a withered arm for sixteen years hanging at her side suddenly shoot it out perfectly whole. We have seen cancers disappear in twenty minutes.'" I cannot help feeling that a great boon would be conferred upon all interested in the subject—and the circle of inquirers is a world-wide one, including many of a very perplexed profession—if the challenge, for such it might reasonably be regarded, were taken up and Mr. Griffith asked for some reasonable proof of the statements he makes regarding the three particular classes of cases he quotes. I presume the first stage of the inquiry would be for Mr. Griffith to supply the names and addresses of the patients cured. These could be given in strict confidence. This information obtained, the patients would be asked to give the names of their medical attendants prior to their cure.

As medical men we know that such statements as those made by Mr. Griffith cannot wholly be accepted on the basis which he wishes or intends should be ascribed to them, however much we may be in sympathy with such supernatural intervention if it can only be proved to be real. As Mr. McAdam Eccles indicates, diagnosis is an essential factor in determining what value may be attached to cures that on the face of them appear to be miraculous. The question, therefore, is primarily and essentially a medical one.—I am, etc.,

A. ERNEST MAYLARD.

Kelvinside, Glasgow, Sept. 10th.

THE DIFFERENTIAL DIAGNOSIS OF SMALL-POX AND CHICKEN-POX.

SIR,—I am fully able to corroborate the points emphasized by Dr. Brand in your issue of July 28th (p. 160), on the differential diagnosis of small-pox and chicken-pox, from my experience of these affections, comprising almost 14,000 cases of small-pox and over 2,000 cases of chicken-pox, during thirty-four years at the Arthur Road Hospital, Bombay.

The diagnosis of chicken-pox does not rest upon the absence of early constitutional disturbances, nor upon the number of vesicles, nor their distribution, but solely upon the characteristics of the eruption. These are: (*a*) The more or less elliptical or oval shape, that may or may not be surrounded by an angry reddish areola; (*b*) the unilocular character of the vesicle, that can be emptied of its serous contents by a single puncture, completely flattening it out, leaving the thin epidermis over its base; (*c*) the simultaneous presence, on one and the same part of the body, of papules, early and late vesicles, dried-up and encrusted vesicles, and even falsely umbilicated vesicles—a combination that has never been noted, to my knowledge and experience, in small-pox; (*d*) the desiccation of the vesicles without suppuration within two or three days or even earlier; and lastly, (*e*) the appearance of successive crops of vesicles over three to five days, each such crop of eruptions being preceded or accompanied by elevation of temperature that may reach 103° to 104° F., especially in children.

One of the chief stumbling blocks, for those unfamiliar with chicken-pox, is the presence of false umbilication. That phenomenon occurs in chicken-pox from the rupture of the vesicle, with or without purulation, through friction with the clothes or scratching, and if examined closely it will be found that the vesicle is not full as in small-pox, but empty, and the epidermis becoming incurved over the flattened base of the eruption presents this deceptive appearance, which is further accentuated by the dark crust of the apex of the vesicle in its centre.

Chicken-pox, as at times observed in Bombay, is by no means such a mild infection. Often and often one meets with severe constitutional disturbance, high fever, delirium, and even convulsions in children, and when followed by the eruption the physician may be led away into declaring it small-pox. But the early vesiculation and drying up, the persistence of pyrexia in some cases after the eruption is fully out, and the characteristics above referred to, should enable one to arrive at a correct diagnosis. *Per contra*, in the preponderatingly larger number of cases, the patient appears at the hospital with a copious crop of vesicles without any previous history of high fever, or even any fever at all preceding it. Such eruption may also be observed on the palate and buccal mucous membrane simultaneously.

As to the gravity of small-pox, it is a factor well known to all who have to deal with it, that the initial appearance of even serious symptoms is no criterion of the severity of the disease, and that many a case that begins with apparently threatening symptoms eventually turns out to be a mild case. Lastly, the presence of lumbar pain is of indefinite significance in the diagnosis of small-pox among the generality of Indian patients, who will complain of pains all over the body.—I am, etc.,

N. H. CHOKSY, C.I.E., M.D.,
Late Assistant Health Officer in Charge Arthur Road Infectious Diseases and Maratha Plague Hospitals, Bombay.

Bombay, Aug. 25th.

TESTS FOR DRUNKENNESS.

SIR,—Would some of your readers who have had special experience give us the benefit of their advice on the best tests for drunkenness? It is very important that doctors, who are so often called upon to decide the question of intoxication in motor drivers and others, should be sure of their ground. Recently a case was withdrawn by the police after their doctor had failed to satisfy the magistrate that the tests he had made were adequate. Do any of your readers know the nature of the tests recently devised by the Danish Medico-Legal Society?—I am, etc.,

Hove, Sept. 6th. L. A. PARRY.

*** The tests for drunkenness recently devised by the Danish Medico-Legal Society are the outcome of the law of 1921, which provides for the permanent withdrawal of the licences of motorists convicted of drunkenness while driving. In co-operation with the police, the Danish Medico-Legal Society decided that it would be impracticable to carry out such tests as the examination of the blood or urine for alcohol, and the system to which our correspondent refers is based on the ordinary clinical tests. The chief merit of the system would seem to be its orderly

classification of various tests; the police surgeon who carries them out methodically takes, on the average, about three-quarters of an hour for each case. He has to make notes on the appearance, behaviour, and gait of the alleged drunkard, and conduct him through a series of tests of the memory and capacity to describe incidents and pictures. Simple sums in arithmetic must be done and many other things requiring a certain degree of mental and physical co-ordination. The Danish Medico-Legal Society has expressed the opinion that, provided this scheme be conscientiously followed, any medical practitioner is capable of giving a satisfactory opinion as to a motor driver's sobriety. In practice, however, the police of Copenhagen have thought it advisable to employ a medical officer, who is available for this work at every hour of the day and night, and who is therefore in a position instantly to investigate a case of alleged drunkenness. This new system seems to have worked satisfactorily on the whole, and it has been found advisable to distinguish between "drunkenness" and "being under the influence of drink." The fate of the licences of the drivers in the latter class is presumably decided according to the circumstances of each case, but the licence of a driver convicted of "drunkenness" is cancelled permanently.

MEDICAL MISSIONS.

SIR,—The sympathetic tone of the paragraph headed "Medical Missionaries" in the Educational Number of the JOURNAL encourages the hope that you may find space for this letter, which is written to expose two common fallacies which one often hears uttered about medical missions.

The first is that some young graduates are "too good for the mission field." (The last time I heard this was on the journey from Dieppe to London last week.) A moment's reflection will show that it is not the more competent but the less competent who should be kept at home, for, here in England, they can, in any emergency, rely on the help of a neighbouring colleague, and in the more obscure cases specialists can be called in. On the other hand, in China the medical man may be absolutely alone to treat patients who have made journeys of hundreds of miles to secure his advice and submit to his treatment. The daily activities of a doctor thus situated may embrace anything from operative obstetric work, and operations for the relief of cataract or intestinal obstruction, to the prophylaxis of plague or other epidemics and the diagnosis and treatment of obscure medical complaints—a variety of work that surely calls for the ablest and best equipped man that can be obtained. I have never met a medical missionary who thought himself "too good" for his job; on the contrary, most of us have often and often longed for the presence of one or other of our old teachers.

The second fallacy is that "only the jobs in the big teaching hospitals (for example, Peking and Chinanfu) are worth a medical man's while." While not wishing to belittle the value of an appointment to such an institution, I do protest most emphatically against the idea that these have any monopoly either of (*a*) interest or (*b*) opportunities for specialism.

(*a*) A friend of mine—a medical missionary in sole charge of a busy hospital—was recently offered a chair in one of these large teaching hospitals, an offer which included not merely a larger salary, but also, what was far more attractive, two years' leave at full salary before taking up the appointment, so that he might visit leading hospitals in Europe and America and familiarize himself with the recent and most advanced work on the subject he was to teach. He declined the offer, finding in his "one man" hospital in a small Chinese city (far away from a treaty port with all *that* holds of civilization and congenial society) need and scope for all he could give, both of ability and of experience.

(*b*) Specialism, while rendered possible by the extraordinary teachableness and ability of the Chinese hospital staff, must depend not less on the doctor himself, on his power of organization and especially of devolution. I believe that medical missionaries specializing in surgery have held world records for the number of successful operations done for chronc intussusception, vesical calculus, and deformed pelvis (that is, Caesarean section for malacosteon disease). The pages of the *Chinese Medical Journal* (and doubtless of the corresponding journals for other countries) will show that even in the smaller mission hospitals physicians have been able to develop research work on specialist lines both for research and for treatment.—I am, etc.,

G. DUNCAN WHYTE, M.D.Edin.,
M.R.C.P.Lond.

London, N.W., Sept. 10th.

AN UNFORTUNATE BROTHER.

SIR,—Dr. F. A. Storr, of Knowle Cottage, Mirfield, has recently had a serious recurrence of illness. As a result of thrombosis of the right femoral artery gangrene of the leg occurred, and this has necessitated amputation in the upper third of the thigh. A long illness in 1921-22 involved him in crushing expenditure for nursing and the provision of a locumtenent in the endeavour to keep his practice together. This recurrence of illness has strained his already depleted financial resources to the limit, and in addition his physical capacity for professional work in the future has been very seriously reduced by the loss of his leg.

The West Riding Medical Charitable Society has made him a generous grant, but we feel that if possible some thing more should be done to help him over the period which will necessarily intervene until he is able to resume some professional work. Any assistance to the fund which we are endeavouring to raise would be gratefully accepted.

Subscriptions may be sent to the London Joint City and Midland Bank, Limited (Mirfield Branch), or direct to any of the undersigned Mirfield practitioners.—We are, etc.,

T. W. SPROULLE.
LESLIE J. MILNE.
H. W. ELWELL.
H. J. DAWSON.

Mirfield, Yorkshire, Sept. 8th.

Obituary.

GUSTAVUS HARTRIDGE, F.R.C.S.,

Consulting Surgeon, Royal Westminster Ophthalmic Hospital.

WE regret to record the death on September 8th, in his 74th year, of Mr. Gustavus Hartridge, F.R.C.S., at his house in Wimpole Street. He was a son of Mr. James Hartridge, of Yalding, Kent, and was educated at King's College, London; he took the diploma of M.R.C.S. in 1872, that of L.R.C.P.Lond. in 1873, and became F.R.C.S.Eng. in 1874. After serving as clinical assistant at Moorfields and acting as Hunterian Prosector at the Royal College of Surgeons of England, he was for a time assistant surgeon to the Central London Ophthalmic Hospital; he was then appointed surgeon to the Royal Westminster Ophthalmic Hospital; he was also lecturer on ophthalmology in the Westminster Hospital, and consulting ophthalmic surgeon to St. Bartholomew's Hospital, Rochester. He gave particular attention to refraction and was the author of a manual on the subject, which reached its sixteenth edition; he also wrote a *Manual on the Ophthalmoscope* and a book on *Retinoscopy*, and was joint author with Mr. C. N. Macnamara of a *Manual of Diseases of the Eye*. Mr. Hartridge was secretary of the Section of Ophthalmology at the Annual Meeting of the British Medical Association in 1889 and vice-president at the Annual Meeting in Newcastle in 1893.

Mr. Hartridge was possessed of kindly qualities of sympathy and gentleness which endeared him to those with whom he was familiar. There was a certain vein of shyness in his character which perhaps accounted for the rarity of his participation in the more social sides of professional work. But once this shyness was forgotten the kindliness of his manner made him greatly beloved. As a clinician he possessed a sureness of observation and judgement which was enviable.

We regret to record the sudden death of Dr. WILLIAM WHITE, of Hadfield, Glossop. Dr. White was born at Laxton, Notts, and educated at the University of Aberdeen, where he studied anatomy under John Struthers and surgery under William Pirrie. He graduated M.B., C.M., "with honourable distinction," in 1876, and M.D. in 1878. After having held the post of house-surgeon at Ashton-under-Lyne Infirmary, he began practice, first at Woolley Bridge, and afterwards at Hadfield, in the borough of Glossop. He was a member of the British Medical Association and a justice of the peace for Glossop and for the county of Derbyshire. He was mayor of Glossop for a year, and deputy mayor for several years during the war. A colleague writes: "The chief feature of Dr. White's character was his devotion to work, evidenced by his popularity and influence among his patients. He leaves a widow, two sons, and a daughter, but his loss is felt by many outside his own family. There is no doubt that he never fully recovered from the shock of losing a son who, as an officer in the Machine Gun Corps, was killed in battle during the war. Dr. White's death removes one of the most prominent personalities in Glossop and the surrounding district."

The death took place on September 1st, after a long illness, of Dr. G. S. HART, Measham, near Burton-on-Trent. He was born in county Londonderry, Northern Ireland, and was educated at Queen's College, Belfast, graduating M.B., B.Ch., R.U.I. in 1891, and M.D. in 1900. He settled in Measham nearly thirty years ago, and for practically the whole of that time carried on a large practice unaided. By his sterling honesty and remarkable devotion to the welfare of the people, he gained the affection and respect of those with whom he had professional dealings, whether patients or medical men. He approached nearly the ideal type of country doctor depicted in fiction by some of the masters of the craft. A skilful practitioner who never spared himself, a wise adviser to those who laid their troubles before him, he was endowed with a quietly humorous turn of mind which charmed his intimate friends. That his unselfish life's work received due appreciation was shown by the large number of those who paid their tribute to it on the day of his funeral. Dr. Hart leaves a widow, two sons, and a daughter, with whom much sympathy is felt.

Medical News.

THE King has granted to Dr. James Ferguson Lees, C.B.E., Director-General of the Egyptian Public Health Administration, authority to wear the Insignia of Grand Officer of the Order of the Nile, conferred upon him by the King of Egypt in recognition of valuable services rendered.

DURING the forthcoming session of the Royal Society of Medicine certain subjects will be discussed by the whole Society, on dates to be announced later. The first of these general discussions will be on the possible substitutes for cocaine; the second on the grading of the population from the point of view of bodily fitness; the third on chronic abdominal pain in nervous women. There will also be joint discussions by the Sections concerned on the following subjects: The treatment of severe gastric and duodenal haemorrhage; birth injuries; the uses and limits of vaccine therapy; vertigo; the surgical treatment of pulmonary tuberculosis; post-operative and puerperal mental disorders. The Society's annual dinner, to be attended by H.R.H. the Prince of Wales, will be held at the Hotel Victoria on Tuesday, December 11th.

AT the National Milk Conference on pasteurization to be held at the Guildhall, London, on November 21st, the chair will be taken in the morning by Viscount Astor, when the methods in use and the physical and the chemical changes produced will be discussed. At the afternoon session Lord Dawson of Penn will be in the chair, and a discussion on bacteriological changes will be opened by Professor Beattie of Liverpool and continued by Captain S. R. Douglas, F.R.S., I.M.S. (ret.) (Medical Research Council), Dr. Thomas Orr, and Mr. Stenhouse Williams of the National Institute for Research in Dairying, Reading. This will be followed by a discussion on biochemical changes, introduced by Professor F. G. Hopkins, F.R.S. The last discussion, on financial and commercial aspects, will be followed by a general discussion. Members of the conference will pay a subscription of 1 guinea, which will include a copy of the report of the conference. Further particulars can be obtained from Miss H. M. Willans, 3, Bedford Square, London, W.C.1.

THE opening ceremony of the winter session at King's College Hospital Medical School will be held at 2.30 p.m. on Wednesday, October 3rd, at Denmark Hill. The introductory address will be given by Mr. H. J. Waring, Vice-Chancellor of the University of London, and Vice-President of the Royal College of Surgeons of England. The annual dinner of past and present students will be held at 7 for 7.30 on the same day at the Connaught Rooms, Great Queen Street, W.C.2, with Professor Arthur Whitfield in the chair.

THE People's League of Health, with the sanction of the Home Office, has arranged for health lectures to be delivered at Oxford, Wormwood Scrubs, and Holloway Prisons during this autumn by Professor Louise McIlroy, Dr. Christine Murrell, Dr. Octavia Lewin, Sir Bruce Bruce-Porter, Sir James Cantlie, Sir John Collie, Professor C. S. Myers, Dr. Marcus Paterson, and Dr. W. J. O'Donovan.

A PARTY of British medical students has recently completed a Continental tour under the auspices of the National Union of Students of Great Britain, a body affiliated to the International Confederation of Students. The party comprised members of the Universities of Oxford, London, Manchester, Liverpool, Leeds, Edinburgh, and Glasgow; and the medical centres visited included Paris, Brussels, Vienna, Prague, Berlin, Munich, Leyden, and Zürich.

A COURSE of six lectures on the social aspect of mental defect will be given by Dr. W. A. Potts at the Tavistock Clinic for Functional Nerve Cases, 51, Tavistock Square, W.C.1, on Mondays, at 5.30 p.m., beginning on October 1st. The fee for the course is 1 guinea.

THE fifth French Congress of Tuberculosis was held recently at Strasbourg. The following papers among others were read: The association of syphilis and tuberculosis, by Professor Sergent; tuberculosis and associated infections, by Dr. Cordier of Lyons; secondary infections in tuberculosis, by Professor Teissier of Paris; anatomical and bacteriological investigation, by Drs. Piery, Mérieux, and Glishmann of Lyons; the tubercle bacillus and associated micro-organisms, by Professor Letulle and Dr. Halbron; tuberculosis and malaria, by Dr. G. Lemaire of Algiers; insurance and tuberculosis, by Dr. Weil of Strasbourg; and housing and tuberculosis, by Dr. Moutet of Paris. The next congress will be held at Lyons in 1926 under the presidency of Dr. Mouisset, president of the departmental committee of the Rhône for combating tuberculosis.

THE twenty-seventh Cookery and Food Exhibition will be held at the Royal Horticultural Hall this year from October 22nd to 26th.

DR. MATTHIAS NICOLL, jun., has been appointed to succeed the late Dr. Hermann Biggs as New York State Commissioner of Health.

A POST-GRADUATE course in pulmonary tuberculosis, including lectures, clinical instruction, and laboratory work, organized by Professor Léon Bernard, will be held in Paris from October 1st to 28th, at the Faculty of Medicine, Hôpital Laënnec, and Dispensaire Léon Bourgeois. The fee is 150 francs.

MESSRS. WILLIAM HEINEMANN announce for early publication a revised edition of the late Dr. R. Murray Leslie's work on *Pneumonia*, by Dr. J. Browning Alexander.

THE Norwegian Government has ordered that the number of registrations of medical students at the University of Christiania shall in future be limited to sixty in each year.

A RECENT Italian law has authorized directors of university clinics and hospital chiefs to override opposition to a necropsy if it is considered scientifically necessary.

TWO cases of rabies occurred in Holland during July, both in the province of Gelderland.

IN the first six months of 1923 there were 9 cases of smallpox in Germany, as compared with 199 in the same period of 1922.

THE medical profession of Frankfurt has dedicated a drinking-fountain to the memory of the Frankfurt physician, Dr. Heinrich Hofmann, the author of *Struwwelpeter*, familiar to many generations of English children.

THE first number, dated October, 1923, of the *British Journal of Experimental Biology* has been issued. The publishers are Messrs. Oliver and Boyd, Tweeddale Court, Edinburgh, and the annual subscription is 40s. post free.

A LECTURE on the treatment of diabetes mellitus by insulin will be given by Dr. Otto Leyton in the anatomical theatre of the London Hospital Medical College on October 15th, at 4.15 p.m. The lecture is intended for senior students of the hospital and post-graduates, to whom a cordial invitation is given.

THE next congress of French-speaking pediatrists will be held at Brussels under the presidency of Professor V. Pechère from October 4th to 7th, when the following subjects will be discussed: Prolonged pneumonia in children, introduced by Dr. Charles Gardère of Lyons; diagnosis and treatment of intussusception, introduced by Dr. Raphael Massart of Paris; medico-pedagogic treatment of abnormal children, introduced by Dr. Decroly of Brussels. Further information can be obtained from the general secretary, Dr. Albert Delcourt, 78, Rue de Trèves, Brussels.

THE twentieth congress of the Italian Society of Laryngology, Otology, and Rhinology will be held at Bologna from October 8th to 10th, when a discussion will be held on otitic pyaemia, introduced by Professors Federici and Torrini. Further information can be obtained from the secretary of the executive committee, Dr. A. Fabbri, Via Santa 2, Bologna.

A SPECIAL two weeks' course in cardiology will be held at the National Hospital for Diseases of the Heart, Westmoreland Street, W.1, from October 15th to 27th. The fee for the course is £7.

THE National Association of Railway Travellers (79, Queen Street, Mansion House, E.C.4) has issued a circular asking for financial support with which to contest the case of season-ticket holders and other travellers by rail before the Railway Rates Tribunal.

THE Eyesight Conservation Council of America has announced that it is about to undertake a national survey of eye conditions; a previous investigation by this organization showed that in the United States 25,000,000 persons employed for gain had eye defects.

A COMMITTEE has been formed to erect a statue in memory of Charles Gabriel Pravaz, the orthopaedist and inventor of the syringe which bears his name, at his birthplace, Pont de Beauvoisin, Isère. His work as an orthopaedist was recently reviewed in this JOURNAL (August 18th, p. 288).

PROFESSOR MAX WOLFF, formerly director of the Berlin University Clinic for Diseases of the Lungs, has recently died.

THE festival of the medical saints Cosmas and Damian was recently celebrated at Luzarches, a commune in Seine-et-Oise, where relics of these saints are preserved.

THE next international congress of thalassotherapy will be held at Arcachon in 1925, when the marine treatment of rickets will be discussed.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediocra Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361 Central).

QUERIES AND ANSWERS.

"R. C." asks for information regarding Moutier's solar syndrome.

"S. M. P." asks where in London he could gain experience in the "twilight sleep" method of treatment.

INCOME TAX.

"F. E." supplied the inspector of taxes last year through a firm of chartered accountants with certified accounts of his practice. This year he has filled in his income tax return himself and finds that the inspector is pressing the accountants to supply a copy of his accounts for 1923.

*** When "F. E." made his return for 1923-24 he presumably made it on the basis of the average of the result of the certified accounts for 1921 and 1922 and the profit shown by a statement prepared by himself of his receipts and expenses for 1923. We suggest that our correspondent should send the inspector a copy of this "1923" statement, first certifying it to be a full and correct statement of his earnings to the best of his knowledge and belief, and point out that as the previously supplied accounts did not show him to be undercharged to tax, the inspector must be reasonably satisfied with his own statement of accounts for 1923.

"J. G." keeps a motor car for professional purposes but used it for a fortnight's motor holiday and occasional outings with friends; the inspector of taxes purposes to disallow 10 per cent. of the total motor expenses.

*** Our correspondent is entitled to deduct only those expenses which he incurred for professional purposes and cannot properly include in his expenses for income tax purposes the costs incurred by his private use of the car. Whether those costs are fairly represented by 10 per cent. of the total expenditure must depend on the facts of the case.

"A. B." arrived in the United Kingdom on April 4th on twelve months' leave; will he become liable to tax if he stays here less than six months, goes abroad for a period, and then returns?

*** Yes, if he spends more than six months in this country in the same financial year—ending April 5th. It has also to be remembered that any person coming to this country with the intention of establishing a residence here is liable even though he is here for a shorter period than six months. Staying temporarily in a borrowed or hired flat would not constitute establishing a residence; that would depend on whether the circumstances as a whole showed that the person concerned had severed his connexion with the foreign place and had formed plans for remaining in the United Kingdom on a permanent or semi-permanent footing.

LETTERS, NOTES, ETC.

DR. A. D. WOOLF (13, The Avenue, Highams Park, E.4) writes: I am anxious to obtain an "etherometer" as manufactured by the late Etherometer Co. of America. I have tried the usual channels in this country but without success, and would be glad to know whether any of your readers has one which he would care to dispose of.

SYMPATHETIC MAGIC?

"M. O." writes: I heard recently of a patient who, being refused information by her doctor as to methods of procuring abortion, inquired "whether it was true that stuffing a pad of cotton-wool into the mother's umbilicus would kill the child by suffocation"? It would be interesting to learn whether this superstition is common. It appears to indicate a belief in "sympathetic magic," but it is difficult to understand how anyone sufficiently acquainted with elementary physiology to realize that the umbilicus has any connexion with foetal respiration could also believe that a proceeding of this sort could affect the child in any way.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 30, 34, 35, 36, and 37 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 32 and 33.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *124*.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Six lines and under	0	9	0
Each additional line	0	1	6
Whole single column (three columns to page)	7	10	0
Half single column	3	15	0
Half page	10	0	0
Whole page	20	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, W.C.2, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.